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South African E-Waste Industry Waste Management Plan (V.1) 2019-2024

Submitted to the Department of Environmental Affairs

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Definitions

'Black Box' function	An E-WASTE PRO function that is out-sourced to an appropriate organisation as it requires confidentiality in working with sensitive industry trade data. The subcontracted operator of the "black box" function is expressly prohibited from releasing any information in respect of any producer market share or data to any person including the E-WASTE PRO and the EEE producers themselves.
3 x "R's" or E-WASTE Management Hierarchy	Reduce, Re-Use, Recycle, Disposal
BBBEE	Broad Based Black Economic Empowerment
Brand Owner	A "brand owner" is defined as a person or category of persons that owns a specific range of products.[1]
Collection	Gathering of waste, including the preliminary sorting and preliminary storage of waste, for the purposes of transport to storage, manual or mechanical processing, and metallurgical processing facilities.[2]
Electronic and Electrical Equipment "EEE"	Global definition "EEE" means electrical and electronic equipment which is dependent on electric currents or electromagnetic fields in order to work properly and designed for use with a voltage rating not exceeding 1000 volts for alternating current and 1500 volts for direct current. "dependent" means needing electric currents or electromagnetic fields to fulfil at least one intended function. DEA Definition (according to Section 28(1) Notice)[3]: "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 measurements of such currents and fields.
E-WASTE Category Classification	As contained in Schedule 3 of the National Environmental Management: Waste Amendment Act, 2014 (Act No. 26 of 2014). E-WASTE is classified both as hazardous and non-hazardous (general) waste. From a cautionary principle point of view the global default classification of "hazardous" is applied throughout the Plan.
Product Responsible Organisation (PRO)	An independent, non-profit industry management body that manages the E-WASTE Industry Waste Management Plan and that, among other things: designs and defines the E-WASTE management regime applicable to South Africa; requires the registration of all EEE producers and recyclers; monitors the EEE products placed on the South African market and the safe and beneficial collection and recycling of that EEE once it

1(Department of Environmental Affairs Waste Act Section 28(1) Notice, 2017)
2(SRI Roundtable International Workshop, 2017)
3(Department of Environmental Affairs Waste Act Section 28(1) Notice, 2017)

	reaches its end-of-life; the setting and management of standards that all participants in the E-WASTE management system need to comply with; the Planning and disbursement of E-WASTE subsidies to support the Plan and to monitor and audit the entire system for adherence and compliance to the Plan.
IndWMP	Industry Waste Management Plan as contemplated in Section 28 of the NEMWA
Informal Waste Collector	Person/s collecting materials of potential value (e.g. packaging waste and E-WASTE) from the streets, other public spaces, households, waste dumps and landfill sites. They do not do this collection as waged or salaried persons and often operate at subsistence level. Also referred to as "Pickers".
Informal E-WASTE Processing	An attempt to maximise sales profits by extracting fractions of value from E-WASTE in the absence of financial (dis) incentives for proper treatment. This is typically characterised by using inappropriate and unsafe (both for the workers and the environment) methods including breaking and smashing of valuable fraction bearing components and burning off undesirable materials and encasings of such value fractions (e.g. copper in cable).
Local and Global Market	These are markets where there is demand for the materials recovered from the processing/recycling of E-WASTE, be they local or international. All materials recovered from E-WASTE processing/recycling, hazardous and non-hazardous, in this Plan must comply with international and national policy and legislation. Trade in these recovered materials that disregard these policies and legislations are deemed to be illegal trade.
Manual Processing	Process to separate and concentrate E-WASTE fractions manually (e.g. by means of sorting, separating, cleaning, emptying, dismantling, de-pollution and segregation).
Mechanical Processing	Process to separate and concentrate E-WASTE fractions mechanically (e.g. by means of shredding, milling, grinding as well as segregation through eddy current or air stream classifiers.
Non-valuable fractions	Fractions of E-WASTE where there is no demand for the fraction, and/or where the fraction represents an unwanted cost that is generally avoided by the market.
NPSWM	National Pricing Strategy for Waste Management
OEM	The Original Equipment Manufacturer is the company that manufactures or assembles the original product under its own brand name. The OEM is also known as a "Manufacturer".
Producer	"Producer" means any person or category of persons or a brand-owner who is engaged in the commercial manufacture, conversion, refurbishment or import of new and/or used- (a) paper and packaging material; (b) lighting equipment; (c) electrical and electronic equipment; or (d) goods wrapped in primary or secondary packaging material, …which are intended for distribution in the Republic of South Africa.The local manufacturer or importer (or their assigned

	agents) of new and/or used EEE placed on the South African market at the point of manufacture or import.[4]
Recycling	Any recovery operation by which waste materials are reprocessed into products, materials or substances, whether for the original or other purposes. It does not include energy recovery and the reprocessing into materials to be used as fuels or for backfilling operations. [SOURCE: European Commission, 2008] E-WASTE Recycling includes the following pre-processing and end processing steps in a basic simplified value chain[5]: • *Manual Dismantling/Disassembly*, Hand Sorting and Decontamination • *Mechanical Size Reduction* (Shredding, milling, granulating, crushing • *Physical/Mechanical Separation* (Gravity, magnetic, air, electrostatic, density, eddy-current separation etc.) • Hydrometallurgy (Leaching and solution purification) and Pyrometallurgy (Smelting) • Electrometallurgy (Electro-winning, Refining)
Refurbishment	Recovery of function of viable assets – subject to certain specifications benchmarked against global industry standards (exercising the re-use priority in the recycling hierarchy)
The Act / NEMWA	The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) and the National Environmental Management: Waste Amendment Act, 2014 (Act No. 26 of 2014)
Valuable fractions	Fractions of E-WASTE where there is demand for the fraction and the market is prepared to pay for acquiring it.
Value Chain	The four stages of the E-WASTE value chain are[6]: • Collection • Dismantling • Pre-Processing • Processing
WEEE (Waste Electrical and Electronic Equipment)	Electronic waste, or WEEE, refers to all items of electrical and electronic equipment (EEE) and its parts that have been discarded by its owner as waste without the intent of re-use[7]
E-WASTE Dismantler	Service provider who manually recovers certain fractions and components of value in E-WASTE
E-WASTE Processors	Service provider who uses either mechanical, chemical, biological or thermal processes to treat E-WASTE fractions received from recyclers to recover secondary resource materials.

4(Department of Environmental Affairs Waste Act Section 28(1) Notice, 2017)
5(Lydall M., Wonder N. , Yulandi J., 2017)
6(Lydall M., Wonder N. , Yulandi J., 2017)
7(Baldé, C. P., Forti, V., Gray, V., Kuehr, R., Stegmann, P., 2017)

Glossary of Terms

°C	Degree Celsius
Ag	Silver
AgCl	Silver chloride
Al	Aluminium
ARF	Advanced recycling fee
As	Arsenic
Au	Gold
B2B	Business to Business
B2C	Business to Consumer
Ba	Barium
BAT	Best available technologies
Be	Beryllium
BEP	Best Environmental Practises
Bi	Bismuth
Bo2W	Best of Two Worlds
Br	Bromine
C&F	Cooling and freezing
CA	Competent Authorities (Basel Convention)
Cd	Cadmium
CFCs	Chlorofluorocarbons
CIA	Central Intelligence Agency
Co	Cobalt
CO2	Carbon dioxide
CRT	Cathode ray tubes
Cu	Copper
CuSO4	Copper sulphate
DEA	Department of Environmental Affairs
DTI	Department of Trade and Industry
EEE	Electrical and electronic equipment
EHS	Environmental, health and safety
EMPA	Swiss Federal Laboratories for Materials Testing and Research
EOL	End-of-life
EPR	Extended producer responsibility
ERA	E-Waste Recycling Authority
EU	European Union
EUR	Euro
E-WASA	e-Waste Association of South Africa
Fe	Iron
FTE	Full time equivalent
GWP	Global warming potential
HCFCs	Hydro chlorofluorocarbons
HCl	Hydrochloric acid
HD	Hard drives

HFC	Hydro fluorocarbons
Hg	Mercury
HNO3	Nitric acid
IC	Integrated circuit
ICCM	International Conference on Chemicals Management
ICT	Information and communication technologies
In	Indium
Ir	Iridium
ISO	International Organization for Standardization
IT	Information technologies
ITA-PEG	Information Technology Association of South Africa, Producer Environmental Group
ITO	Indium tin oxide
IWMP	Industrial waste management Plans
Kg	Kilogram
kg/cap.year	Kilogram per capita and year
LCD	Liquid crystal display
Li-Polymer	Lithium polymer
LOI	Loss of ignition
Max	Maximum
Mg	Magnesium
Mm	Millimetre
OPS	Overarching Policy Strategy
PoM	Placed on Market
TBM	Trans Boundary Movement of Hazardous Waste (Basel Convention)
WEEE	Waste Electronics and Electrical Equipment
WMB	Waste Management Bureau
WMO	Waste Management Officers

Foreword

This plan has been prepared in alignment with article 6 (1) (m) of the Section 28 notice (No. 41303) call for industry plans which requires the IndWMP to use the "EPR 'tax' (Government managed)" model set out in section 6.3 of the "National Pricing Strategy for Waste Management" (No. 40200). During the preparation of this plan strong feedback from industry has been noted in that whilst it is accepted that the "Government managed" model has been followed in preparation of this plan it would be more cost efficient for producers, importers and ultimately the consumer if industry were to manage all elements of the plan including finance. Given the strong preference from industry to manage the plan, including the finances, their preferences have been noted in Appendix 16.

Executive Summary

The ERA E-WASTE Industrial Waste Management Plan targets the following objectives:

- The establishment and implementation of a national unified E-WASTE management system which follows the REDUCE, REUSE, RECYCLING, RECOVERY based integrated waste management hierarchy through the promulgation of a national Plan called the E-WASTE IndWMP and as contemplated in Chapter 6 and Chapter 8 and (by providing a high-level overview of options) in Appendix 10.

- The establishment of a national E-WASTE management authority to implement the E-WASTE IndWMP and to assist the Waste Bureau to regulate all stakeholders involved in E-WASTE generation, recycling and disposal as described in Chapter 9.

- The definition of all key stakeholders, the roles that they are expected to play, as well as the registration and accreditation of all stakeholders who wish to participate in the E-WASTE management system as contemplated in Chapter 4 and with a strong focus to benefit historically disadvantaged individuals as typical for the Tier 4 Recyclers described in this chapter.

- Setting targets for E-WASTE collection, recycling, processing and disposal as provided for in Chapter 10, Section 10.1 as well as summarized in Appendix 11[8].

- The structure for setting of a waste management charge which is initially to be levied equally on all imported and locally manufactured EEE placed on the South Africa market, whether new or 2nd hand. This levy is based on a standard rate per kilogram of EEE. The specific list of EEE goods to which the levy will be applied is listed in Appendix 1 and the suggested calculation of the Management Levy/Fee is noted in Chapter 10, Section 10.5.

- The establishment of programmes and activities aimed at addressing the challenges and opportunities presented by E-WASTE and, through the E-WASTE management authority, ensure the equitable and sustainable application of resources accruing from the E-WASTE management levy to support these programmes and activities as found in the Chapter 10 sections 10.3.1-10.3.5.

[8]Appendix 11 summarizes the 5 Year Projection of all WEEE generated, collected and recycled as well as the number and types of new Enterprises supported and volumes of e-waste expected to be collected and recycled by the latter.

- The development of a Local Enterprise Development strategy to benefit the "previously disadvantaged" as defined by the Governments BBBEE policies (whilst not precluding any other person, organisation or entity) and as contemplated in Appendix 15.

- Be accountable to all contributing stakeholders, government and the public for the disbursement of the E-WASTE management levy and the results achieved through the adoption and implementation of the E-WASTE IndWMP with the envisaged headline targets / results reflected in Section 10.2 as well as Appendix 11 over a period of 5 years

- In order to appreciate the issues to which the E-WASTE IndWMP responds, Chapter 3 provides a brief overview of relevant local and international government policy and legislation applicable (augmented by a more detailed contextual analysis that can be found as Appendix 13 of the ERA IndWMP).

According to the GreenCape Market Intelligence Report in 2016, twenty companies including refurbishers, recyclers and metal extractors collectively processed 45 000 tons of e-waste which accounts for only about 12% of all E-WASTE generated. With the ERA IndWMP the proposed increase over 5 years would amount to 26% of all E-WASTE recycled by 2023.[9] The report further notes that only an 8% in E-WASTE diversion can result in a market potential of R22 million and create 650 local jobs. The report estimates the 2016 market size of E-WASTE to be in the region of R38million with a potential material value found in South African E-WASTE to be in the region of R280 million and an overall job creation potential of 8700 jobs.

The Market Intelligence Report finally concludes with the notion that there was around 322,000 tons of E-WASTE generated in 2015/2016, with only around 38 000 tons diverted from landfill, leaving at least 280,000 tons available for recycling.

The E-WASTE generation rates for 2017 is assumed by the ERA Steercom to be 360 000 tons. The estimated number of jobs generated by this IndWMP is around 10 500 jobs (See Paragraph 10.6 for Jobs created over 5 years).

[9]Provided the Plan starts getting implemented in 2018 and measured against the baseline of 360 000 tons chosen.

Contents

Definitions 2

Glossary of Terms 5

Foreword 7

Executive Summary 7

1. **Introduction** 12

1.1 Scope and Boundaries for the IndWMP 13

1.1.1 E-WASTE Types Covered According to Definition and Category 13

1.1.2 Exclusions to the IndWMP 15

1.1.3 Capturing of Minority Opinion from Steercom Members 15

2. **Historical Background** 16

2.1 Planned Next Steps 16

3. **Contextual Analysis (Legislative)** 17

3.1 Government Policy/Legislation Regulating Aspects of South African E-WASTE Management 17

3.2 International Context And Policy 17

3.3 Legislative E-WASTE IndWMP Drivers and Key Strategic Elements 18

3.3.1 Role of Industry in IndWMPs 18

3.3.2 Mainstreaming Producer Responsibility 18

3.4 Minimum Content Requirements of an IndWMP 19

4. **Stakeholder Identification and Their Roles and Responsibilities in the ERA E-WASTE Value Chain** 21

4.1 EEE Producers 21

4.2 EEE Distributors 23

4.3 E-WASTE Recyclers (Tier 1) - Large Scale E-WASTE Recycling Companies 24

4.4 E-WASTE Recyclers (Tier 2)-Medium to Small Scale E-WASTE Recyclers 27

4.5 E-WASTE Recyclers (Tier 3)- Buy-Back Centres and Drop-Off points for E-WASTE 29

4.6 E-WASTE Recyclers (Tier 4) - Informal Street, Household and Landfill E-WASTE Collectors 32

4.7 E-WASTE End-Use Recyclers and Exporters 35

4.8 E-WASTE Transporters 39

4.9 Government 42
4.10 Consumers of EEE 43
4.10.1 Household Consumers 43
4.10.2 Corporate and Public Entity Consumers 43
4.11 ERA E-WASTE Inspectorate 44
5. **Quantities and Types of E-WASTE Generated from EEE Products Locally Manufactured and Imported** 47
5.1 Context 47
5.2 Status Quo 47
5.2.1 South African Current E-WASTE Generation Rates 49
6. **Quantities of E-WASTE : Reused, Recycled or Recovered** 50
6.1 Context 50
6.2 Status Quo 50
6.2.1 Source Reduction Measures 51
6.2.2 Re-use Measures 52
6.2.3 Recycling Measures 52
6.2.4 Recovery Measures (Collection and Take-Back) 56
7. **Quantities of E-WASTE : Disposed Of** 60
7.1 Context 60
7.2 Status Quo 61
7.2.1 General Municipal Landfill and Disposal of E-WASTE Fractions 61
7.2.2 Current E-WASTE Disposal Practices 62
8. **The Waste Management Hierarchy and How the ERA IndWMP is Giving Effect to It** 64
8.1 OptimIzing E-WASTE Flows for an E-WASTE Management System 64
8.1.1 Repair and Reuse Optimisation 64
8.1.2 More and Better Recyclate That Can Be Locally Processed, Recycled and Treated 64
8.1.3 Safe and Optimised Transboundary Movement of E-WASTE to & from South Africa 65
8.1.4 Other Required Governmental Optimisation Intervention 65
9. **The ERA E-WASTE Product Responsibility Organisation (PRO)- Objectives and Structure** 67

9.1 Name and Type of organization 67
9.2 Composition of the ERA Board of Directors 67
9.3 The Nature of ERA as a Non-Profit Company 68
9.4 ERA Goals and Objectives 68
9.5 ERA Structure and Functions 71
9.6 KPIs of the ERA IndWMP 72
9.7 Corporate Social Investment 73
10. **ERA E-WASTE IndWMP Targets, Programmes and Budgets** 74
10.1 WEEE Collection and Recycling Targets 74
10.2 E-WASTE Collection and Recycling Enterprise Targets 76
10.3 ERA Budget Allocations 79
10.3.1 ERA Administration and Operations 80
10.3.2 ERA Technology Investments and Research and Development 81
10.3.3 ERA Education and Awareness 82
10.3.4 ERA Recycling (E-WASTE Handling) Subsidy 82
10.3.5 ERA Enterprise Development 83
10.4 E-WASTE Recycling Subsidy / Handling Fee 88
10.5 E-WASTE Management Levy / Fee 92
10.6 Jobs Created Over 5 Years 93
10.7 ERA and the Waste Management Bureau 95
11. **Conclusion** 96
Bibliography 97
Appendixes 98

1. Introduction

This ERA E-WASTE Industrial Waste Management Plan (IndWMP) is the suggested fundamental framework for managing E-WASTE in South Africa. Modification might be necessary where new facts and options come to light during the initial 5-year implementation period (2018-2023), but these must be enhancements and not a dilution of the fundamental co-ordinates of this IndWMP.

Despite the best of efforts of the ERA Steercom team to respond to and address all the content requirements (as listed in chapter 3.4.Minimum Content Requirements of an IndWMP" and in the comparative Table of Appendix 6), not all the requirements might be addressed to the fullest due to the fact that the Steering Committee Members (who all operated entirely on a voluntary basis) struggled to obtain relevant and critical data (like EEE import and local manufacture figures) required to make more accurate forecasts.

In addition, (and as described in paragraph 5.2.1), E-WASTE generation rates are conflicting between various research reports, the DEA and the practical experience of the ERA Steercom Members. The ERA Steercom team has compiled the ERA IndWMP (the Plan) with the information contained in the main body and its 16 Appendixes.

The Plan aims to address the minimum contents required as specified by the DEA while also providing contextual information that explains for example the budgets and programmes envisaged for the next 5 Years. It seeks to set out a course that can close the data and information gaps and that addresses the fundamental need for a comprehensive, locally based, E-WASTE 'collection and recycling footprint' as well as appropriate control of E-WASTE so as to mitigate its adverse characteristics and promote its economic potential to the fullest.

To this effect the ERA E-WASTE IndWMP targets the following E-WASTE management factors:

- The establishment and implementation of a national unified E-WASTE management system through the promulgation of a national Plan called the ERA E-WASTE IndWMP.
- The establishment of a national E-WASTE management authority to implement the ERA E-WASTE IndWMP and to assist the Waste Bureau to regulate all stakeholders involved in E-WASTE generation, recycling and disposal.
- The definition of all key stakeholders, the roles that they are expected to play, as well as the registration and accreditation of all stakeholders who wish to participate in the E-WASTE management system.
- Clarify the challenges and opportunities presented by E-WASTE, and the desired outcomes and approaches to be adopted in managing these challenges and opportunities.
- Setting targets for E-WASTE collection, recycling, processing and disposal.
- The setting of a waste management charge which is based on the ERA operational budget and initially to be levied equally on all imported and locally manufactured EEE placed on the South Africa market, whether new or 2nd hand. The levy is based on a standard rate per kilogram of EEE. The specific list of EEE goods to which the levy will be applied is listed in Appendix 1.
- The establishment of programmes and activity aimed at addressing the challenges and opportunities presented by E-WASTE and in collaboration between the E-Waste management authority and the Waste Bureau to ensure the equitable and sustainable application of resources accruing from the E-WASTE management levy to support these programmes and activities.

- Be accountable to all contributing stakeholders, government and the public for the disbursement of the E-WASTE management levy and the results achieved through the adoption and implementation of the ERA E-WASTE IndWMP.
- Regarding the expected E-WASTE generation, collection and recycling rates as well as the number of new and existing enterprises that will be supported and their envisaged contribution to E-WASTE collection and recycling, the ERA E-WASTE IndWMP has the headline targets / results over a period of 5 years reflected in Appendix 11.

It is the opinion of the ERA Steercom that only a uniform national Plan that involves all the relevant stakeholders and that goes to the heart of the relevant issues is desirable and can work in South Africa at this juncture. There may be some producers of EEE who will deny the undesirable composition of their products and who want to set themselves apart from other EEE sub-sectors in the hope that they will have reduced responsibility, including financial responsibility, for the safe handling and treatment of E-WASTE. In such cases the Plan relies on strong EPR enforcement measures coming from Government to deal with any "free-riders".

Speaking to the same issue, some producers will point to out that their particular EEE products are not among those products posing the biggest risk to health and environment and they mention the trace amounts of hazardous elements in their relatively low hazard products.

The ERA Steercom asks that the extrication of ANY trace hazard as well as any value bearing fraction involves the careful collection, handling and disassembly of E-WASTE under controlled conditions. This involves allocating appropriate resources and designing a coherent system of norms and standards that need to reflect the actual steps and technologies involved in all types of activities and practices and in accordance to the various levels of "pre-processing" derived from Tier 1 to Tier 4 Recyclers. (See also Chapter 5).

The Plan has not prejudiced any type of E-WASTE recycler along the entire E-WASTE value chain and provides many potential benefits for all, save for those who refuse to take on the responsibility of recycling E-WASTE responsibly.

1.1 Scope and Boundaries for the IndWMP

1.1.1 E-WASTE Types Covered According to Definition and Category

Definition of E-WASTE

For the purpose of this Plan and as defined by and adopted from the EU WEEE Directive "WEEE is all electronic and electrical equipment that has come to the end of its useful life and can no longer be used for its originally intended purpose."

As such 'EEE' 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 and designed for use with a voltage rating not exceeding 1 000 volts for alternating current and 1 500 volts for direct current.

For a more detailed description of the character and classification of E-WASTE please refer to Appendix 14 which offers a contextual analysis.

Types of Products that cause E-WASTE

All EEE goods entering the South African market, irrespective of being new or second-hand (referred to as Used EEE (UEEE), and whether imported or locally manufactured, will end up being E-WASTE (or WEEE) and are therefore covered with the Plan.

Covered Lifespan of EEE

The useful life-spans of EEE goods vary from two years for mobile phones and up to fifteen years for refrigerators. In part, the variation in the life-span of E-WASTE even for the same type of product can be attributed to cheaply manufactured EEE as well as rapid technological innovation in the EEE industry. "Historical E-WASTE" (also called "legacy waste") that is currently stockpiled in businesses, homes and government departments will be also addressed by the ERA IndWMP despite the challenge and real threat that this might present in setting and meeting E-WASTE recycling targets.[10] To this end all EEE, UEEE and "End of Life" EEE becoming E-WASTE irrespective of the remaining life-span is covered by the Plan.

E-WASTE Categories

The ERA IndWMP follows globally defined E-WASTE categories and the following 10 standardised and simplified groups of E-WASTE have been covered by the IndWMP. (Further detailed in Appendix 1 of the ERA IndWMP):

Table 1: South African E-WASTE Categories

1	LARGE HOUSEHOLD APPLIANCES
2	SMALL HOUSEHOLD APPLIANCES
3	IT AND TELECOMMUNICATIONS EQUIPMENT
4	CONSUMER EQUIPMENT AND PHOTOVOLTAIC PANELS
5	LIGHTING EQUIPMENT*
6	ELECTRICAL AND ELECTRONIC TOOLS (WITH THE EXCEPTION OF LARGE-SCALE STATIONARY INDUSTRIAL TOOLS)
7	TOYS, LEISURE AND SPORTS EQUIPMENT
8	MEDICAL DEVICES (WITH THE EXCEPTION OF ALL IMPLANTED AND INFECTED PRODUCTS)
9	MONITORING AND CONTROL INSTRUMENTS
10	AUTOMATIC DISPENSERS

*Note: Since **lighting equipment** (category 5 above), is being dealt with as a specialized waste stream requiring its own IndWMP, it has been excluded from the ERA E-WASTE IndWMP.

All E-WASTE is covered irrespective of market value and toxicity

There are many fractions and materials in EEE, and subsequently in E-WASTE, which are of no or low value, and sometimes toxic, which pose a risk for the effective management of E-WASTE as they tend generally not to be pre-processed or processed by end-users into new recycled goods. This is in large part due to the lack of demand for these fractions and/or the lack of useful and profitable applications for such recycled material. This phenomenon can be traced back to EEE manufacturing processes that disregard the necessity for all end-of-life goods to be re-processed maximally in order to avoid landfill and in order to eliminate the hazards (real or possible) posed by products when they

[10] Much WEEE generated over decades was scavenged for any materials of value and has left mostly "liability fractions"

reach their end-of-life. This factor points to a couple of imperatives on which the E-WASTE IndWMP has to address as well:

a) Encourage the reduction of hazardous substances used in manufacturing EEE and ensure that all EEE is manufactured from materials that are recyclable, for new EEE manufacture as well as for alternate use.
b) Provide support for research and development into the recycling of E-WASTE, especially for low value fractions and components.
c) Alongside (b) above, invest in recycling technology and processes that produce useful resources and products and also stimulate markets for such recycled goods and materials.
d) and end-use processing of E-WASTE

1.1.2 Exclusions to the IndWMP

There are a number of elements which the Plan does not cover as yet. These are the following:

No allowance has been made for the intrinsic toxic load of various EEE products, and whether subsequently a differential E-WASTE management levy should be charged for certain toxic substances or toxic substance loads. This factor can only be properly considered as ERA develops its capacity to deal with such complexity and as the IndWMP matures with implementation.

It is proposed that in line with practices in other parts of the world, the pricing of E-WASTE should be based on weight by category of product. A levy factored on the toxicity of EEE could also be considered but would be very difficult to apply with any consistency for the following reasons:

- Subjecting every imported product to an ASSAY test to determine the nature and levels of their toxicity would be impractical due to cost, time, as well as the logistical hold-ups this would cause at the point of importation.[11]
- Even in the case of a single product, the rate of innovation within the EEE sector means that its material composition can be partially or radically transformed from year to year.
- Furthermore, the producers of EEE are often reliant on the supply of component parts for their products from specialist component producers.
- Essentially, the desirability of using product toxicity as a factor in the determination of E-WASTE charges needs to be assessed against the practicality, complexity and fairness of doing so. It is proposed that this factor be deferred as a determinant of E-WASTE management levies, and if found necessary, a further toxicity levy can be considered.

While the Plan has a strong focus on the diversion of E-WASTE from general landfill sites, it does not address the requirements or financing required for additional hazardous landfill or treatment sites.

No allowance has been made for the Waste Management Bureau administration in dealing with ERA.

1.1.3 Capturing on Minority Opinion from Steercom Members

The protocol that was agreed to in the ERA Steering Committee was that minority positions on key issues could be included as annexures to the plan. However, such minority positions have to be fully formulated by those holding such minority positions. See Steercom Report/s in Appendix 8.

11All imported EEE products are subjected to an SABS test before they are cleared for importation and ICASA provides clearance for mobile phones in the market. The relevance of these measures to determine the toxicity of EEE imports needs to be assessed.

2. Historical Background

This Plan is the product of many discussions and meetings among multiple stakeholders representing the EEE sector all along the value chain and other role players in the E-WASTE industry. An E-WASTE Consultative Meeting called by the Department of Environmental Affairs (DEA) on 29 October 2014 led to the formation of an E-WASTE Industry Waste Management Plan Steering Committee as DEA indicated that an E-WASTE Industry Waste Management Plan (IndWMP) would be required as provided for in Sections 28 and 29 of the Act. [12]

The draft E-WASTE IndWMP produced by the E-WASTE Association of South Africa (EWASA) and the IT Association of South Africa Producer Environmental Group (ITA PEG)[13], provided a first framework and a building block for the current version of the ERA IndWMP[14].

However, since E-WASTE constitutes more sources than ICT, the Plan had to broaden and input had to get opened up to a bigger stakeholder group (e.g. through the recent inclusion of the South African Domestic Appliance Association (SADA).

After numerous deadlines for a Section 28 Notice had passed and the first Section 28 Notice in August 2016 was withdrawn, the final and official "Call on the Paper and Packaging Industry, Electrical and Electronic Industry and Lighting Industry to Prepare and Submit Industry Waste Management Plans to the Minister for approval" was announced by the Minister on 6th December 2017 in Government Gazette 41303.

2.1 Planned Next Steps

A final round of sector-based and broader public consultations (following the publication and consultation on this Plan as required by Section 28 and Section 73 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) is being conducted between June and July 2018.

The E-WASTE Steering Committee will continue to work on the integration of relevant public and sector-specific comments into the final Plan that will be submitted to the Minister of Environmental Affairs for endorsement and promulgation. The Steering Committee has already transformed into an E-WASTE Product Responsibility Organisation (PRO) and has registered a non-profit company called the ERA E-WASTE RECYCLING AUTHORITY NPC. (See Chapter 9 and Appendix 2 for details)
The appointment of office-bearers of ERA NPC to oversee the implementation of the IndWMP will e concluded through the stakeholder consultative process currently being undertaken.

12The Steering Committee details and details of the invitees and attendees at the initial DEA consultative meeting that took place in the period 2014 are reflected in Appendix 3, 4 and 7

13The ITA PEG represents ITC producers and their approach to WEEE management

14In the early development phase of the Plan the ERA Steering Committee (Steercom) undertook a systematic review of the existing plans and the current version of the Plan is a fair synthesis of all the matters deliberated and agreed within the Committee.

3. Contextual Analysis (Legislative)

While South Africa does not yet have any legislation specifically and exclusively related to E-WASTE there are elements in the existing legal framework that directly or indirectly regulate certain aspects of E-WASTE management.

To this end this Plan responds to a number of government policy and legislative imperatives. The most important of these are listed here and certain contextual information supplementing the motivation for an IndWMP as envisaged by ERA is further described in Appendix 13.

3.1 Government Policy/Legislation Regulating Aspects of South African E-WASTE Management

- Constitution of the Republic of South Africa
- The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) and the National Environmental Management: Waste Amendment Act, 2014 (Act No. 26 of 2014) and Allied Policy and Regulations
- Second Hand Goods Act

The following legislations also impact on the management of waste in South Africa in general and have been noted in other studies on E-WASTE

- Hazardous Substances Act (Act 5 of 1973)
- Health Act (Act 63 of 1977)
- Environment Conservation Act (Act 73 of 1989)
- Occupational Health and Safety Act (Act 85 of 1993)
- National Water Act (Act 36 of 1998)
- Municipal Structures Act (Act 117 of 1998)
- Municipal Systems Act (Act 32 of 2000)
- Mineral and Petroleum Resources Development Act (Act 28 of 2002)
- Air Quality Impact Act (Act 39 of 2004)
- SAWIC Waste Policy and Regulations
- Waste Management Licenses Required – Section 20(b) of the NEMWA 59 of 2008

3.2 International Context and Policy

- Basel Convention
- WEEE Directive
- Restriction of Hazardous Substances (RoHS)[15]

[15]ATE Study, this is a difficult factor for South Africa to control as the bulk of EEE is imported and intellectual property (IP) regulations means that companies manufacturing EEE are not obliged to disclose the composition of their components. South Africa is dependent on alignment with major industrialised countries from where these goods designed and manufactured.

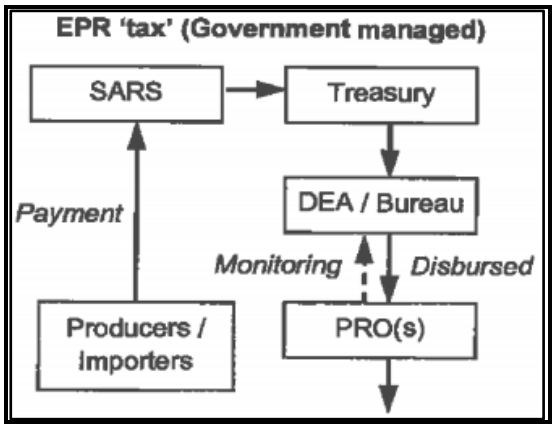
3.3 Legislative E-WASTE IndWMP Drivers and Key Strategic Elements

By enforcing Section 14(1) of the Waste Act the Minister declared E-WASTE (next to Lighting and Paper and Packaging as well as Tyres) a priority waste stream and therefore was able to request for arrangements and measures to be put in place to manage and control this waste stream for minimal pollution and environmental degradation, as well as maximum beneficiation.

Among the measures to be implemented to manage a priority waste stream is a provision for the development of an Industry Waste Management Plan as contemplated in Sections 28 and 29 of the Act.

Article 6 (1) (m) of the Section 28 notice (No. 41303) requires the IndWMP to use the "EPR 'tax' (Government managed)" model set out in section 6.3 of the "National Pricing Strategy for Waste Management" (No. 40200).

Figure 1: EPR Tax Scheme as described in the National Pricing Strategy for Waste Management



The government-managed model sees EPR fees collected by SARS at the point of the producer placing product on the market. Those EPR fees go to Treasury and the Waste Bureau based on the approved plan for E-WASTE recycling, requests those funds from Treasury. Effectively the determination of the cost of recycling by the PRO should set the baseline for the EPR fee collected by SARS.

3.3.1 Role of Industry in IndWMPs

Section 5.1.5 of the National Waste Management Strategy sees the industry as playing the role of being the "obligated party" regarding meeting the objectives of the Act and that the IndWMP is the primary instrument for achieving this vision. It sees the private sector representative bodies as having an important role to play in the advancement of education and awareness, in the implementation of the Plan and in ensuring compliance from businesses in the industry.

3.3.2 Mainstreaming Producer Responsibility

Section 18(1) and (2) of the Act, makes provision for the Minister of Environmental Affairs, after consultation with the Minister of Trade and Industry, to "identify a product or class of products in respect of which extended producer responsibility applies". This includes identifying who is responsible for products on the SA market and specifying measures to be taken in dealing with the waste of that product or class of products. These could include requirements around the reduction, reuse, recycling, recovery, treatment and disposal of waste, as well as institutional arrangements and target setting.

3.4. Minimum Content Requirements of an IndWMP[16]

In the Section 28 Notice of 6 December 2017, under Section 6.1 in paragraph 5 the Minister lists the minimum content requirements for an IndWMP as follows:

An industry waste management plan must,

(a) identify all the parties to the industry waste management plan;

(b) provide details of the governance model for the industry waste management plan, including how industry representation and participation will be addressed;

(c) provide the annual projections over a five-year period of the-

i. quantities and types of waste generated from locally manufactured products and products imported that will become waste and will be managed through the industry waste management plan;
ii. (ii) quantities of waste that will be re-used, recycled or recovered;
iii. (iii) quantities of waste that will be disposed of;

(d) indicate how the waste hierarchy is going to be given effect to in the implementation of the industry waste management plan prioritizing reduce, re -use and recycling, then recovery;

(e) include measures to prevent pollution or ecological degradation;

(f) include measures or programmes to minimize the generation of a particular waste stream and final disposal of that waste stream;

(g) include measures or actions to be taken to manage the waste;

h) identify the manner in which the waste transporters, storage facilities and processors who will receive the waste through the industry waste management plan will be identified and registered;

i) identify any incentives that will be applied in order to encourage the end user to practice good waste management;

j) identify the potential number of waste transporters, storage facilities and processors that will be required;

k) indicate the manner in which the waste collected and processed will be recorded;

l) provide estimations of the costs of implementing the industry waste management plan for a period of five years and the submission of an annual business plan to the Bureau including a breakdown of the activities of the industry waste management plan together with their costs;

m) be aligned to the National Pricing Strategy for Waste Management (Extended Producer Responsibility; government managed model) as published under Government Notice 904 of 11 August 2016;

16(Department of Environmental Affairs Waste Act Section 28(1) Notice, 2017)

n) provide targets for waste minimization through the reduction, re-use, recycling and recovery of waste for a period of five years;
o) provide details of the manner in which the previously disadvantaged individuals and transformation will be integrated in the implementation of the industry waste management plan;

p) provide where applicable, an estimate of the revenue that will be generated through the implementation of the industry waste management plan for a period of five years;

q) indicate how the industry waste management plan will raise national awareness regarding the management of the particular waste stream;

r) provide detailed measures on how the industry waste management plan will address issues of social responsibility in the specific waste sector and issues of historically disadvantaged communities;

s) provide specific measures in which historically disadvantaged individuals will meaningfully participate in the waste sector and the implementation of the industry waste management plan;

t) provide specific targets on job creation, the promotion of small businesses, training and development, including the meaningful participation of the historically disadvantaged individuals that will be realized in the waste sector;

u) indicate the frequency and methods of auditing and reporting to the Bureau on the industry waste management plan envisaged;

v) provide measures to be implemented to give effect to the best environmental practice for the management of a particular waste stream;

w) provide details of the manner in which the informal sector will be integrated in the implementation of the industry waste management plan.

4. Stakeholder Identification and their Roles and Responsibilities in the ERA E-WASTE Value Chain

The ERA Plan has identified the following stakeholders and the parameters for each one's participation and specific role envisaged in the ERA driven E-WASTE management system are discussed in detail in the relevant sections below as it relates to:

- Description and summary of the activity that they undertake in relation to the Plan and the current status of each stakeholder as it relates to the targets set for the Plan
- Plan's expectations of the standards applicable to each stakeholder and the terms and conditions under which they can participate in the E-WASTE management system
- Reporting obligations of each stakeholder
- Metrics applied in adjudicating the accreditation and co-option of functional stakeholders in the implementation of the Plan
- Benefits of participation in the Plan for each stakeholder
- Planned investments and support mechanisms available for each stakeholder group participating in the implementation of the Plan, as well as the targets to be achieved by each functional stakeholder in the Plan.

Direct participants in the ERA-driven E-WASTE management system:

- EEE Producers (including EEE/UEEE Importers)
- EEE/UEEE Distributors
- Tier 1 Recyclers – Large scale E-waste recycling companies
- Tier 2 Recyclers – Medium to small scale E-waste recyclers
- Tier 3 Recyclers – Buy-back centres and drop off points for E-waste
- Tier 4 Recyclers–Informal street, household and landfill E-waste collectors
- E-WASTE End-Use Recyclers and Exporters
- E-WASTE Transporters
- ERA E-WASTE Inspectorate

Critical Support Mechanism Parties:

- Government
- Consumers of EEE (Households)
- Consumers of EEE (Corporate and Public)

4.1. EEE Producers

EEE producers are those who import and/or manufacture EEE and who place new or used EEE on the South African market. It has been determined through deliberations and information exchange amongst Steercom members, that while many Original Equipment Manufacturers are based overseas, there are a fair number of "assemblers" found locally. It is estimated by Steercom that about 20% of the EEE goods on the South African market is assembled locally and that there may be as many as 5,500 producers bringing EEE product onto the SA market. However, there are about 50 known producers who could account about half of the EEE on the South African market. (For a provisional list of OEMS please also refer to Appendix 7).

Imports account for the largest percentage of EEE goods brought onto the South African market. There tends to be dominant sets of importers and original equipment manufacturers (OEMs) for

major categories of EEE. Affordability is a major consideration for the majority of South Africans and there is a viable market for refurbished goods. Imported second-hand EEE also contributes to the EEE and E-WASTE in South Africa – the most noticeable among them are personal computers and mobile phones.

Overseas donations by companies and charities to local South African organisations and institutions also contribute to the amount of EEE and E-WASTE in South Africa and it was determined as an estimate amongst ERA Steercom Members that as much as 50% of these donations comprised PCs that are not functional / refurbish-able, and can be deemed to be a direct importation of E-WASTE.

As highlighted under chapter 1.1 Scope and Boundaries for the IndWMP", no distinction is made between locally or internationally manufactured EEE. The Plan aims that those responsible for placing EEE or UEEE on the local market be responsible for participating in the Plan.

As it is pointed out in the Section 28 Notice[17]

"A producer must either-

a) prepare and submit an industry waste management plan to the Minister for approval within nine months from the date of publication of this Notice; or
b) subscribe to an industry waste management plan submitted to the Minister, and
c) ultimately, subscribe to an industry waste management plan approved by the Minister.

According to the Notice given all Producers were required to register as Producers with the DEA by 6 February 2018, and they have been given until 6 September 2018 to either submit their own IndWMP or subscribe to a Plan submitted on their behalf by a PRO such as ERA.

If they fulfil their EPR obligations via ERA they will have to register the amount of EEE which they place on the South African market. Producers will also be required to pay the E-WASTE management levy determined for all the categories of EEE goods covered by this Plan (and listed in Appendix 1) at the point when it is imported defined as "the first invoice of sale" irrespective if it is new EEE or used EEE (UEEE).

Producers operating their own voluntary E-WASTE take-back programs are not exempt from the obligations to subscribe to an IndWMP. Producers are able to continue to operate their own voluntary E-WASTE take back programmes as a subscriber of an E-WASTE IndWMP.

These voluntary efforts will be counted in reports on E-WASTE recycling in South Africa - on the same indices and metrics applied in the E-WASTE IndWMP. Their contribution to meeting the challenge of creating a viable E-WASTE management system, infrastructure and operating protocol will be included in reports to DEA, stakeholders and the public. They will also continue to make input into and collaborate with the ERA IndWMP.

It is hoped that Producers consider their registration with ERA as an EEE importer / manufacturer, their declaration of EEE placed on the market and the payment of the associated E-WASTE management levy as an appropriate system for managing their products when they reach their end-of-life.

[17](Department of Environmental Affairs Waste Act Section 28(1) Notice, 2017)

Reporting and Labelling Obligations

Further contributions towards enabling safe and sustainable E-WASTE management requires that Producers share information on the effects on the environment and human health due to the presence of hazardous substances in EEE by providing appropriate labelling, product markings and information to consumers and recyclers which includes the following:

- marking of product with a crossed-out wheeled bin symbol to indicate separate disposal as required by EU WEEE Directive;
- the requirement not to dispose of E-WASTE as unsorted municipal waste and to collect such E-WASTE separately;
- the return and collection systems available to them, encouraging the coordination of information on the available collection points irrespective of the producers or other operators which have set them up.

Regarding the EEE Producer's role in contributing to re-use, recycling and other forms of recovery of E-WASTE this particular stakeholder is required to:

- provide accurate EEE product weights as SARS records the weight of EEE imports and sometimes it records only the number of units imported;
- make available on request Material Safety / Environmental Data Sheets to recyclers;
- if possible, provide dismantling instructions to recyclers; and
- adhere to any other further appropriate standards and conditions as specified by ERA from time to time.

4.2 EEE Distributors

EEE Distributors are most notably wholesale agents, mass chain stores, shop level retailers as well as online retail stores.

The most important contribution, as a stakeholder in the E-WASTE value chain, is for "EEE distributors" to assist with the consolidation of ALL E-WASTE by taking back all E-WASTE. In terms of Section 59 of the Consumer Protection Act (CPA), retailers are obliged to take back EEE for responsible recycling at no charge to the consumer. This obligation has however yet to be enforced.

While many retailer chains offer selected drop off services for various types of E-WASTE -typically combined with trade-in options in the case of ICT goods-, such initiatives are currently purely voluntary and hence proper enforcement of the CPA as an additonal enabler to improve E-WASTE recovery and recycling rates is considered to be crucial. Take-back liability should minimally be linked to the type of EEE that gets sold. The ERA E-WASTE IndWMP attempts to assist in the challenge of storage space for 'take-back' E-WASTE.

In addition to providing the required take-back services to any of their clients[18], it is also the role of the Distributor to provide information and education on how any of the EEE types traded are to be treated responsibly and safely when becoming post-consumption E-WASTE.

[18]irrespective if the clients are from the private (household and businesses) or public (Governments and any public facilities) sector

4.3 E-WASTE Recyclers (Tier 1) - Large Scale E-WASTE Recycling Companies

Tier 1 E-WASTE recyclers recycle E-WASTE and refurbish EEE on a large scale and according to standards and practises promoted by this Plan.

The most important difference between Tier 1 and Tier 2 E-WASTE recyclers is the amount of E-WASTE that they collect and treat on an annual basis. They essentially vary only in size of operation and in E-WASTE treatment capacity. Tier 1 recyclers tend to have clear end use markets (typically located overseas) for their consolidated and homogenised E-WASTE fractions. Tier 2 recyclers tend not to handle volumes that warrant export and therefore tend to sell their E-WASTE fractions onto Tier 1 Recyclers.

According to Steercom deliberations, there are approximately 7 recyclers that broadly comply with the operating standards and practices defined in this Plan for Tier 1 E-WASTE recyclers. According to the E-WASTE Technology Landscape Report,[19]Tier 1 recyclers are typically large scale pre-processors applying "second level" treatment steps. They function next to formal collection and selected manual dismantling (including any required de-pollution), and are therefore primarily concerned with technologies that "involve liberating complex, multi-material E-WASTE components from each other through the application of physical force; and separating valuable metal and non-metal fractions from each other into distinct recyclate streams (iron and steel, copper, aluminium, plastic, PCBs, glass, etc.)"[20].

Large-scale E-WASTE recycling companies mostly exist as standalone entities or subsidiaries of established international metal recycling companies and corporations. They possess a considerable degree of market power in the local recycling industry by owning a large fleet of E-WASTE collection trucks, warehousing and storage facilities and pre-processing facilities. They are typically diversified with regards to geographic presence in South Africa either through wholly-owned provincial operations or strategic alliances with smaller recycling companies.

According to the mapping done via the WEEE Technology Landscape reports for typical representatives of Tier 1 service providers "refurbishment is not the core focus of their business operations and such businesses account for a significant portion of total E-WASTE handled and processed in South Africa as they process between 1,000 and 5,000 tons of E-WASTE per annum (hence averaging 2500 tons each) with E-WASTE recycling revenues of between R10 - R100 million per annum. Pre-processing operations are typically done in line with end-customer's specifications for each E-WASTE fraction; such companies employ over 100 people; and typically they have ambitious project pipelines that will enable them to transition into world class (cradle-to-cradle) "end-use recyclers"[21].

ERA IndWMP Obligations for Tier 1 Recyclers

Tier 1 recyclers are required to register with ERA and receive accreditation as Tier 1 E-WASTE recyclers. In order to benefit from the E-WASTE IndWMP, they are required to meet the criteria for such accreditation, and fulfil all contractual arrangements with ERA as defined below.

Environmental Compliance

- Ensure that all requisite environmental waste management licenses and permits for operations, transport, storage and treatment of E-WASTE are obtained - in line with Sections 21 -27 of the NEMWA 2008 / as amended 2014

[19](Lydall M., Wonder N. , Yulandi J., 2017)
[20](Lydall M., Wonder N. , Yulandi J., 2017)
[21](Lydall M., Wonder N. , Yulandi J., 2017)

- National or provincial Hazardous Waste Management License is compulsory
- Comply with all municipal legislation concerning legality of their site of operation
- Comply with the Basel Convention and have relevant and current trans-frontier shipment export licenses / permissions where required
- Report into the SAWIS database
- Use only licensed hazardous waste transporters to transport E-WASTE or any hazardous fractions thereof
- Mandatory implementation of an EPEAT[22] certified standard within three years from the promulgation of the E-WASTE IndWMP

Company Standards

All legally required company registrations have been obtained and are complied with. These include the following:

- CIPC (Company Registration)
- SARS (Income Tax, PAYE, UIF, VAT) Registration
- Department of Labour (UIF, Workmen's Compensation, etc.) Registration
- BBEEE - Be at least BBEEE Level 4 compliant or BBEEE exempt
- Comply with Second-Hand Goods Act

Industry Standards

- ISO 9001 – Operational / Process standard. It is necessary that Tier 1 E-WASTE recyclers have ISO 9001 certification and/or comply with an ERA-approved equivalent.
- ISO 14001 - Environmental standard for E-WASTE. It is compulsory that all Tier 1 E-WASTE recyclers have ISO 14001 certification specific to E-WASTE and specific to operational sites.
- ISO 18000 - Health and Safety standard. It is compulsory that all Tier 1 E-WASTE recyclers have and OHSAS 18001 certification.

Other Conditions and Terms of Operation

In addition to the standards and compliance requirements above, they must commit to adhere to any other operating standards specified by ERA from time to time. Among those that are required for registration as an accredited Tier 1 E-WASTE recycler, they must have the following in place:

- Operate from secure and insured premises, including environmental liability insurance to address any environmental remediation that may be required.
- Use of proper accounting stationery, especially receipts and invoices for all sale and purchase transactions related to E-WASTE. Payments and transactions must be done by electronic banking and/or telephonic method only. There must be no unrecorded cash transactions.
- Only send/export E-WASTE fractions to end-use recyclers/processors that are EPEAT compliant (or its equivalent) or which are ERA and /or DEA approved.
- Never dispose of any E-WASTE in landfill sites, and if it is inevitable, to do so at appropriate hazardous landfill sites.

[22]EPEAT (Electronic Product Environmental Assessment Tool) is a ranking system that helps purchasers in the public and private sectors evaluate, compare and select PCs and Displays, Imaging Equipment, Televisions, Mobile Phones and Servers based on their environmental attributes. Criteria include design, use and end of life attributes. EPEAT requirements for recycling standards vary across the categories of PC & Displays, Imaging Equipment and Televisions. EPEAT certified standards are preferred according to ITA-PEG as it includes R2, e-Stewards and WEELABEX that are internationally recognised as well as other scheme recycling standards.

ERA accreditation and adjudication process for registration of E-WASTE recyclers

The recycler seeking accreditation will apply to be registered and accredited as an ERA-approved Tier 1 recycler. The application process will be standardised for ease of use, and applicants will be guided and advised by relevant ERA staff on how to meet all of the necessary pre-requisites for registration / accreditation.

A member of the Inspectorate will undertake a due diligence exercise by doing a site and records inspection of the E-WASTE treatment site. Based on the documents before it, and on the inspector's report, the adjudication panel, after interviewing the applicant if necessary, will make a determination on whether to approve or defer approval of an application. The reason for deferment will be given in writing, and it will specify what needs to be done to remediate the application for successful registration / accreditation.

Accreditation will be based on the following:

- The extent to which the recycler meets the prerequisite operational standards and certifications required by ERA.
- The extent to which the recycler accepts the terms and conditions of accreditation.
- The extent to which the recycler accepts all E-WASTE (and not only fractions of E-WASTE) and the extent to which it commits to the responsible disposal of that E-WASTE to a hazardous landfill site and/or transfer to another accredited recycler for further processing.
- A demonstration of the recycler's willingness and ability to submit the required reports.
- The extent to which the recycler is able to present a viable business Plan and its BBBEE rating.
- The extent to which the recycler has equipment and infrastructure required to treat E-WASTE in the manner that meet the treatment standards prescribed by ERA.
- The number and level of jobs which will arise as a result of the accreditation / registration of the recycler.

Reporting Obligations

Once recyclers have been registered and accredited by ERA, they will be required to provide reports as per reporting requirements stipulated below. They will also be expected to subject themselves to inspection (operations monitoring and data verification) by the Inspectorate and to independent audits to verify their compliance with the terms and conditions of their accreditation, as well as the accuracy of their reports.

The reports from accredited E-WASTE recyclers will include minimally the following:

- E-WASTE received by source, category and weight
- Re-use of EEE by product volumes refurbished
- Failed refurbishment and the category and weight of the E-WASTE resulting from this
- Final processed fractions detailed by fraction/material category and the weight of those fractions. This report must also specify the destination to which all fractions/materials categories have been supplied.

These reports are due on a monthly basis, on the first working day of the new month and must be submitted to the data management company (black box) contracted to ERA to manage such data in a confidential manner. These reports will also serve as invoices for the payment of E-WASTE handling fees due to the recycler in accordance with the recycling handling fee scale and schedule of payments as discussed in the detail of the IndWMP.

Agreements

Accreditation by ERA will be in the form of an agreement between ERA and the recycler and will specify the conditions under which accreditation / registration has been approved as well as other

contractual arrangements regarding the collection, treatment and disposal of E-WASTE processed by the recycler.

Benefits and Support

The accredited recycler will receive free (and specified) stock quotas delivered from the ERA E-WASTE collection system (Tier 2, 3 and 4), and which quota will be dependent on the top-up E-WASTE stock required over and above what the recycler is able to procure by itself. This strategy will be aided by the expanded E-WASTE collection footprint provided by ERA through the support of Tier 3 (drop-off points and buy-back centres) and Tier 4 (street and landfill collector) operations. Other stock will be procured through the call-in E-WASTE collection service operating within the E-WASTE management system.

The logistics and transport costs for collecting E-WASTE from Tier 3 recyclers will be covered by ERA in accordance with the scale and schedule of payments as discussed in Chapter 10: "Programmes and Budgets".

It is recorded that the E-WASTE transport and logistics network will only function in the movement of E-WASTE from Tier 3 recyclers to Tier 1 and 2 recyclers. All other transport costs incurred outside of this feeder system will be for the recycler's own cost.

In addition to the support discussed above, the accredited / registered recycler will receive an E-WASTE handling subsidy fee based on the scale and schedule of payments as defined chapter 10 of the IndWMP. Certain fractions of E-WASTE will carry higher handling fees due to the cost associated with compliant treatment and disposal of those fractions. It is hoped that the increase in E-WASTE stock volumes, aided by the E-WASTE handling subsidy and the increase in delivered E-WASTE stock will provide the recycler with benefits associated with economies of scale when they trade their E-WASTE fractions with E-WASTE processors and other downstream markets.

Provision has been made for ERA to help leverage investments sought by recyclers for the development and installation of technologies as required for local beneficiation and treatment of certain E-WASTE fractions and materials.

ERA's research and development programme will involve the direct commissioning of research into E-WASTE processing technologies, business models, business process engineering and a range of other subjects that can benefit individual recyclers, categories of recyclers and others in the system. ERA will also support an independent research programme into E-WASTE-related matters.

As discussed, ERA will also lend its support, in a structured manner, to assist recyclers to meet the required conditions for accreditation. It is also hoped that the recyclers' accreditation with ERA and the branding that goes along with that, will attract more independently sourced E-WASTE stock.

4.4 E-WASTE Recyclers (Tier 2)-Medium to Small Scale E-WASTE Recyclers

There are approximately 25 recyclers that broadly comply with, and would be willing to comply with the operating standards and practices defined in this Plan for Tier 2 Recyclers. Typically, they are small to medium size businesses predominantly concerned with formal collection, transportation and "manual dismantling" activities which are defined as the first level of pre-processing and the second stage in the E-WASTE recycling value chain (after collections) and to a much lesser degree with mechanical pre-processing activities.

According to Steercom deliberations, it is estimated that they currently manage and treat an average of approximately 80 to 200 tons of E-WASTE each per annum in a substantially but not fully compliant manner. The WEEE Technology landscape report assigns E-WASTE volumes of between 10 and 500 tons to companies with Tier 2 characteristics. For the purpose of facilitating projections in Chapter 10 an average of 80 tons of E-WASTE processing p.a. is assumed. They sell the fractions produced via off-take agreements with large Tier 1 type recyclers. Refurbishment accounts for a significant portion of their revenue (approximately 60%) while recycling accounts for the remaining 40%. They often play the role of "niche players" that are based in particular geographic locations or focus on specific E-WASTE streams. Logistically they operate between 1 and 2 trucks for E-WASTE collection activities; have revenues of between R1-R10 million per annum; and employ between 5 and 25 people each.[23]

ERA IndWMP Obligations for Tier 2 Recyclers

Tier 2 recyclers are required to register with ERA and receive accreditation as Tier 2 E-WASTE recyclers. In order to benefit from the E-WASTE IndWMP, they are required to meet the criteria for such accreditation, and fulfil all contractual arrangements with ERA as defined below.

Environmental Compliance

- Ensure that all requisite environmental waste management licenses and permits for operations, transport, storage and treatment of E-WASTE are obtained - in line with Sections 21 -27 of the NEMWA 2008 / as amended 2014
- National or provincial Hazardous Waste Management License is compulsory
- Comply with all municipal legislation concerning legality of their site of operation.
- Comply with the Basel Convention and have relevant and current trans-frontier shipment export licenses / permissions where so required
- Report into the SAWIS database
- Use only licensed hazardous waste transporters to transport E-WASTE or any of its hazardous fractions
- Optional implementation of an EPEAT certified standard within three years from the promulgation of the E-WASTE IndWMP

Company Standards

As for Tier 1, all legally required company registrations must have been obtained and complied with. These include the following:

- CIPC (Company Registration)
- SARS (Income Tax, PAYE, UIF, VAT) Registration
- Department of Labour (, UIF, Workmen's Compensation, etc.) Registration
- BBEEE - Be at least BBEEE Level 4 compliant or BBEEE exempt
- Comply with Second-Hand Goods Act

Industry Standards

- ISO 9001 – Operational / Process standard. It is necessary that Tier 2 E-WASTE recyclers have ISO 9001 certification and/or comply with an ERA-approved equivalent[24].

[23](Lydall M., Wonder N. , Yulandi J., 2017)

[24]Ghana has (via the SRI project) released in March 2018 the first African "Technical Guidelines on Environmentally Sound E-Waste Management for Collectors, Collection Centers, Transporters, Treatment Facilities and Final Disposal" http://www.sustainable-recycling.org/ewaste-guidelines-ghana_2018_epa-sri/ These kind of best practice guidelines will be looked at by ERA to develop suitable South African Industrial Standards in the future.

- ISO 14001 - Environmental standard for E-WASTE. It is compulsory that all Tier 2 E-WASTE recyclers have ISO 14001 certification specific to E-WASTE and specific to operational sites.
- ISO 18000 - Health and Safety standard. It is compulsory that all Tier 2 E-WASTE recyclers have and OHSAS 18001 certification.

Other Conditions and Terms of Operation

As applicable for Tier 1 Recyclers

ERA accreditation and adjudication process for registration of Tier 2 E-WASTE recyclers

As applicable for Tier 1 Recyclers

Reporting Obligations

As applicable for Tier 1 Recyclers

Agreements

As applicable for Tier 1 Recyclers

Benefits and Support

As applicable for Tier 1 Recyclers

4.5 E-WASTE Recyclers (Tier 3) - Buy-Back Centres and Drop-Off points for E-WASTE

According to Steercom deliberations there are in the region of 600 E-WASTE drop-off points and buy-back centres located throughout South Africa. Among these are municipal drop-off sites (named "garden sites" in Gauteng and elsewhere which double up as E-WASTE sorting sites), retailer E-WASTE take-back sites and institutional and recycler managed collection and drop-off sites. Buy-back centres operate either formally (hence tax registered and fully legally compliant) or are to various degrees informal and hence operate illegally. The latter type will NOT benefit in any form from the E-WASTE IndWMP based support structures unless they reach FORMAL operational and hence legally compliant status.

Currently each of these sites collects an average of between 3 and 18 tons of E-WASTE per year. It is estimated that they manage about 3600 tons p.a. collectively.

The form and shape of these points and centres vary considerably. Some have a 120L wheelie bin for receiving E-WASTE deposits, others are larger industrial containers and yet others are open spaces used for E-WASTE consolidation and which is typically recovered by informal E-WASTE collectors. There is also considerable theft of valuable E-WASTE fractions and materials from unguarded and unprotected facilities.

ERA IndWMP Obligations for Tier 3 Recyclers

Tier 3 recyclers are required to register with ERA and receive accreditation as Tier 3 E-WASTE Recyclers. In order to benefit from the E-WASTE IndWMP, they are required to meet the criteria for such accreditation, and fulfil all contractual arrangements with ERA as stipulated for the "general terms and conditions" equally applicable for Tier 1 and 2 recyclers and these special requirements stated below:

Environmental Compliance

Ensure that all requisite environmental waste management licenses and permits for operations, transport, storage and treatment of E-WASTE are obtained - in line with Sections 21 - 27 of the NEMWA 2008 / as amended 2014

- Tier 3 type "recyclers" must fulfil the Governmental "Norms and Standards for Storage" as well as "Listed Activity" requirements should the volumes and conditions under which they collect and store and pre-process E-WASTE cross the threshold for such licensing exemptions.
- They must operate to ERA-approved standards.

Company Standards

Ideally, all Tier 3 entities will comply with all legally required company registrations and have no variations from the Tiers 1 and 2 requirements. However, in recognition of the Plan's enterprise development objectives, Tier 3 recyclers must minimally have an association agreement concluded on an ERA-designed template that defines the objectives and responsibilities the Tier 3 entity.

Industry Standards

Tier 3 recyclers will be required to comply with ERA defined and approved minimum Health and Safety standards. These ERA standards will be harmonised and aligned with the "IWA ISO Guidance Principles for the Sustainable Management of Secondary Metals"[25] as it is set to become a global ISO standard defining minimum operational and technical conditions for different type of economic operators. Tier 3 and Tier 4 type of activities and stakeholders will be given incremental steps and support to achieve compliance with this standard. ISO 9001 and ISO 14001 accreditation is waivered in favour of an ERA-approved equivalent that is more suited to the realities of this level of recycler.

Other Conditions and Terms of Operation

All general terms stipulations as applied to Tiers 1 and 2 recyclers apply save in respect of the following:

- They must receive training on the application of the standards and standard operating procedures required as well as the reporting requirements associated with accreditation at this tier – as defined below.
- They can refurbish and sell complete E-WASTE units BUT must not engage in any form of first or second level pre-processing (e.g. not dismantle or disintegrate any of the E-WASTE which they receive into smaller (value bearing only) fractions
- They must sell their entire E-WASTE stock exclusively to ERA accredited Tier 1 and 2 E-WASTE recyclers.
- As such, they are not allowed to trade E-WASTE with any other E-WASTE processor, except for receiving E-WASTE from Tier 4 recyclers (informal collectors).

ERA accreditation and adjudication process for registration of E-WASTE recyclers at Tier 3

The process of applying for and the adjudication of the application for registration is exactly the same as for Tiers 1 and 2 recyclers – with no exception or variation.

Reporting Obligations

The reporting obligations of Tier 3 recyclers are as stipulated for Tiers 1 and 2.

Agreements

Agreements are as stipulated for Tiers 1 and 2 recyclers. It is specifically stipulated that Tier 3 recyclers are free to enter into contractual arrangements to supply E-WASTE stock to Tier 1 or 2

[25](SRI Roundtable International Workshop, 2017)

recyclers of their choice. Such arrangements will depend on the value that they can realise for their E-WASTE as well as any other benefits offered by their recycler of choice. However, the free transportation of E-WASTE to a recycler of their choice falls away when that Tier 1 or 2 recycler of choice is more than **80kms** from the Tier 3 site. Such transportation of E-WASTE will be for the account of the Tier 3 or 2 or 1 recycler, and no further subsidy will be provided for this transportation activity.

Benefits and Support

The accredited Tier 3 recycler will receive E-WASTE stock from the public dropping off their E-WASTE at buy-back centres as well as from Tier 4 (informal recyclers) who have collected their E-WASTE from households, the streets and open spaces or from landfill sites. As they will be more accessible, due to the extent of their operational footprint within local communities, these centres will provide the first important and controlled link in the E-WASTE management chain. As they are not allowed to be selective in what E-WASTE they accept, these centres will, through competitive pricing in relation to scrap metal dealers, encourage informal collectors not to engage in destructive recycling practices like the smashing or burning of E-WASTE to extract metals or other materials of value.

It is recorded that the E-WASTE transportation and logistics network will only function in the movement of E-WASTE from Tier 3 recyclers to Tier 1 and 2 recyclers. All other transport costs incurred outside of this feeder system will be for the recycler's own cost.

The accredited / registered Tier 3 recycler will receive an E-WASTE handling fee based on the scale and schedule of payments as defined in the detail in the IndWMP. Certain fractions of E-WASTE will carry higher handling fees due to the cost associated with compliant treatment and disposal of those fractions. In addition to passing on the minimum subsidy to accredited Tier 4 recyclers, the additional revenue benefit which they realise from their trade with Tiers 1 and 2 recyclers can be passed onto Tier 4 recyclers in accordance with what makes them more competitive than other trade options, whether these are scrap metal recyclers or other Tiers of the E-WASTE recycling hierarchy.

The Tier 3 recycler will benefit from ERA and related recycler training programmes in the appropriate handling of E-WASTE and related matters, like the support which ERA will provide in preparing them for and in facilitating their accreditation and business development processes.

It is also hoped that the Tier 3 recyclers' accreditation with ERA and the branding that goes along with that, will attract more E-WASTE stock from more local sources. Like Tiers 1 and 2 recyclers, Tier 3 recyclers are free to trade on the back of their ERA accreditation to secure more corporate E-WASTE management contracts in their own name and right. It is specifically recorded that corporate EEE consumers will not be prohibited from supplying their E-WASTE to Tier 3 recyclers as an alternative to Tier 1 and Tier 2 recyclers.

In addition ERA will provide limited but substantial infrastructure and equipment support to Tier 3 recyclers as is further described in detail in the Chapter 10.3.5.1 "ERA Enterprise Development". The equipment and infrastructure will remain the property of ERA until such time as the Tier 3 recycler meets the KPIs and other conditions under which this support will transfer into a business infrastructure grant. These KPIs and conditions will be developed before any support of this nature is provided to any Tier 3 recycler. ERA will retain the right to re-assign the infrastructure and equipment to other Tier 3 recyclers in the event that any Tier 3 recyclers stops operating, or fails to meet the conditions required for the transfer of ownership of such infrastructure and equipment.

Under no circumstances can a Tier 3 recycler assign his rights and obligations to any other E-WASTE recycler, unless it is an ERA accredited recycler and that such assignment is expressly approved by ERA in writing.

In instances where the Tier 3 operation is based on a pre-existing E-WASTE drop-off or collection point, provision has been made to subsidise the facility holding the E-WASTE, the training of supervising security staff and part of the salaries required for a 24-hour shift as well as any personal protective equipment needed in sorting/temporary storage activities. It is hoped that these incentives will bring any existing drop off and buy-back centres in line with the operating conditions required by ERA.

4.6 E-WASTE Recyclers (Tier 4) - Informal Street, Household and Landfill E-WASTE Collectors

Tiers 1, 2 and 3 type recycling businesses and facilities represent the FORMAL side of E-WASTE recycling stakeholders and therefore the Plan merely seeks to codify their standards and practices with regards to E-WASTE collection (including storage and transportation) and treatment.

It is at Tier 4 that the E-WASTE management system really has the potential to revolutionise opportunities in E-WASTE collection and provide meaningful and increasingly formalised safe and environmentally sound working conditions and job creation opportunities for Tier 4 Recyclers. Additional local economic development opportunities are further expounded in Appendix 15.

The decision to make the main beneficiaries of the Plan the Tier 4 Recyclers is based on the fact that there are, according to informal sector research done by the CSIR,[26] at least 60,000 to 90,000 informal waste collectors of which many are affiliated to the South African Waste Pickers Association SAWPA.

For the sake of being able to build further assumptions about the ERA E-WASTE IndWMP additional job creation/enterprise development potential, it is estimated that approximately 10,000 of the waste pickers deal with E-WASTE on a fairly consistent basis whereas about 2,000 collectors have E-WASTE collection as their “core business”.

According to the WEEE Technology Landscape report “these are unlicensed and unregistered individuals that pick up E-WASTE together with other recyclables from municipal landfill sites, shopping malls and refuse bins in suburban centres for onward sale to entry-level recyclers. EWASA estimates that they account for approximately 25% of the total volume of E-WASTE recycled in South Africa”.[27]

While not possible to quantify accurately, it is estimated that about 10,000 informal collectors in South Africa collectively collect and 'recycle’ about 11,250 tons of E-WASTE p.a. According to the 80/20 rule it is further assumed that about 2,000 collectors will have E-WASTE as their core business and that they collectively collect around 2,000 tons of E-WASTE p.a.

They typically sell their E-WASTE to small scrap metal dealers who typically fulfil the role of a middleman. Large scrap metal business such as SA Metal, Reclaim and Universal Recycling operate properly registered buy-in services of E-WASTE and other metals and offer market-related prices, but a lot of smaller middleman businesses operate to varying degrees of formality and in a financially exploitative manner. This essentially includes forcing Tier 4 Recyclers *indirectly* (through their limited and highly specified E-WASTE buying preferences) to engage in risky and environmental unsound “value adding” practices such as burning cables to extract copper and/or smashing formerly untampered with E-WASTE to extract selected value fractions.

26(Godfrey L., Strydom W. and Phukubye R., 2016)
27(Lydall M., Wonder N. , Yulandi J., 2017)

Since municipal waste collection services do not have a separate E-WASTE collection system, it is up to Tier 4 Recyclers to pick out the E-WASTE from general household and business waste and to collect from the streets and landfills. In large metropoles such as Cape Town, recent waste characterisation studies at various landfills showed that 1- 2% of materials currently disposed of is E-WASTE[28]).

A rough assumption made in the Plan is that each of those 10,000 informal collector/recyclers handling E-WASTE could deal with up to between 200kg of E-WASTE per annum. The volume of household E-WASTE which they could offer the compliant E-WASTE recycling sector could be considerable if properly supported by the ERA.

It is planned that ERA will systematically seek to register 2,000 informal E-WASTE collectors. Once registered, these Tier 4 recyclers will undertake to comply with a basic code of good practice which involves them signing a declaration that they will not burn, smash or recycle E-WASTE to extract high value fractions and discard the rest on landfills or any public space. They will commit to trading E-WASTE with only ERA-accredited E-WASTE recyclers. It is most important that they commit to trade their E-WASTE with only accredited E-WASTE recyclers than with which Tier of recycler they trade with.

Environmental Compliance

It is unlikely that awareness of the health and environmental hazards of improper E-WASTE recycling, in and of itself, will make much difference to their practices due to the socio-economic factors driving their current practices - i.e. the *indirect* instruction to engage in unsound practices in order to recover value bearing E-WASTE fractions. Hence financial and other environmental health and safety working conditions improvement incentives will be key drivers for gaining their cooperation with the broader system of ERA accredited E-WASTE management service providers.

It is believed that through discussion with informal E-WASTE collector organisations such as the South African Waste Pickers Association (SAWPA) and through the minimum E-WASTE handling subsidy a significant increase in motivation and effort to collect household and business E-WASTE can be achieved. Improved environmental compliance would be achieved by informal E-WASTE collectors as E-WASTE collected in its entirety and full integrity (as found) will be eligible for the E-WASTE handling subsidy when they sell it any ERA accredited recycler. It is anticipated that such a financial incentive together with the accessible E-WASTE drop-off point and buy-back centre footprint will encourage vibrant trade in E-WASTE among Tier 3 and 4 E-WASTE recyclers.

The absolute minimum requirement from Tier 4 collectors / recyclers is the undertaking that they will use appropriate PPE when handling E-WASTE and that they will not engage in the destruction of E-WASTE. They will commit to only supplying their collected waste to ERA accredited E-WASTE recyclers.

Company Standards

No formal corporate registration and associated legalities are required from Tier 4 E-WASTE collectors / recyclers in order to participate in the E-WASTE IndWMP.

Industry Standards

There is no specific industry standard that can be imposed upon the Tier 4 recycler, save that as a condition for registration and support from the IndWMP, they will need to practice their trade with due regard to the code of good practice which they commit to. It is however suggested that Tier 4

28 This information was informally shared with a Steercom Member by JG Africa who currently undertakes detailed Waste Characterisation studies for the City of Cape Town

Recyclers need to be a members of SAWPA so that the Tier 4 recycling sector can negotiate fair and safe access to material with government authorities and gain public and private sector recognition as a formalised co-operation based movement.

Other Conditions and Terms of Operation

There are no other terms and conditions to which the South African Tier 4 recycler needs to adhere to other than to respect the obligation of accredited E-WASTE recyclers to capture essential personal identification information in order comply with the Second-hand Goods Act.

ERA accreditation and adjudication process for registration of Tier 4 E-WASTE collectors and recyclers

After joining SAWPA as a Member any Tier 4 E-WASTE collector / recycler can opt to approach any ERA stakeholder to assist him/her in gaining accreditation as a dedicated Tier 4 E-WASTE collector and recycler. S/he can also approach ERA directly for such accreditation.

It is planned, however, that the Tier 3 E-WASTE recycler will select from among his/her waste collectors those whom s/he thinks will be inclined towards plying his/her waste collection and recycling activities in an IndWMP compliant manner. S/he will explain the requirements and benefits of registering as a Tier 4 E-WASTE collector / recycler with ERA and will make the recommendation to ERA for such accreditation. Such a recommendation will be made in a prescribed format that demonstrates that the recommendation has been made on serious and considered grounds. Among the criteria for such recommendation and accreditation would be the assessed trust-worthiness of the applicant, the extent to which s/he is a regular E-WASTE trader and the extent to which s/he will be a sound ambassador for ERA among other waste collectors. A fixed or known address will also be an important consideration in the granting of such accreditation due to payment and auditing requirements. A minimum of 3 months' regular trade with an accredited E-WASTE recycler will be required before that E-WASTE recycler can make his/her recommendations for a Tier 4 collector to be accredited by ERA.

A simple, rapid and fairly rigorous assessment will be made of the application by an adjudication committee comprising a combination of ERA and Inspectorate personnel who will decide on whether or not to grant such accreditation. This decision will be ratified at the appropriate staff level within ERA.

The conditions on which accreditation is granted to an informal E-WASTE collector and recycler will be defined in the Code of Good Conduct (see below) that s/he will sign with ERA.

Reporting Obligations

Aside from fulfilling the declarations required by the Second-hand Goods Act when delivering E-WASTE to accredited E-WASTE recyclers, the Tier 4 E-WASTE collector and recycler will have all of his/her reporting obligations fulfilled by the accredited E-WASTE recycler with whom s/he trades his/her E-WASTE.

S/he, however, will be obliged to be available to the Inspectorate and/or auditors as part of the sample to be audited for compliance with the terms and conditions of their ERA accreditation and for the purposes of auditing Tier 3 recycler's compliance with the terms of their accreditation and the reports which they submit to ERA.

Summary of Tier 4 Code of Conduct

Below is a summary of the key conditions associated with Tier 4 E-WASTE recycling accreditation:

- They must not engage in unsafe and unhealthy E-WASTE recycling practices and prohibitions will be clearly spelt out in their Code of Good Practice declarations.
- They must undertake to use appropriate PPE (as supplied by ERA) when handling E-WASTE.

- They must ensure that they take on all E-WASTE and trade all E-WASTE with ERA accredited E-WASTE recyclers.
- They must undertake to cooperate with the ERA Inspectorate and auditors.
- They must be good ambassadors for ERA among the general public.
- They must undertake to commit to basic training in E-WASTE appropriate recycling methods.
- They must never discard any E-WASTE on general landfill sites
- They must adhere to any other standards specified by ERA from time to time

Agreements

In addition to ERA holding a copy of a formally sworn undertaking of Good Practice, the Tier 4 E-WASTE recycler will be issued with clearly branded ERA PPE which will serve as a public display of their accreditation. The PPE will also be marked with the registration number applicable to Tier 4 E-WASTE collectors and recyclers registered with ERA.

Benefits and Support

By wearing the ERA issued PPE, the Tier 4 E-WASTE collector and recycler will become known in the streets, with households and among his/her peers to be an E-WASTE IndWMP-compliant E-WASTE collector and recycler. By so doing /s/he can start making formal and semi-formal arrangements with households and small businesses to collect their E-WASTE. It is hoped that this approach will increase the volume of E-WASTE which various consumers will make available to him or her and add significantly to renewed community respect regarding the valuable contribution this individual makes.

As an additional support mechanism ERA will provide him/her with simple information brochures on the desired procedures for managing E-WASTE within households, and this will be reinforced by ERA's public awareness and education campaigns around E-WASTE.

A key benefit to registering is that the Tier 4 E-WASTE collector and recycler will be trained in the basics of E-WASTE management and there will be accessible points for trading his or her E-WASTE. S/he will be offered the minimum E-WASTE handling fee for all the E-WASTE which s/he supplies into the accredited E-WASTE management system. ERA will provide an industrial strength 3-wheel bicycle, fitted with a standard one-ton waste bag holder, a basic bicycle repair kit and branded PPE available to the first 2000 Tier 4 E-WASTE collectors and recyclers in order to improve his/her range of operation and his/her E-WASTE carrying capacity.

4.7 E-WASTE End-Use Recyclers and Exporters

There are currently only two known E-WASTE end-use recyclers/end-processors in South - namely SA Precious Metals and Rand Refinery. They recover secondary resources from homogenous fractions E-WASTE (e.g. containing the desired metal elements) to recover such secondary materials which are then subsequently used in the (mostly overseas) manufacture of new EEE goods and other products.

Both local E-WASTE "end-use" recyclers and (pre-processing) type of recyclers send E-WASTE fractions and materials recovered from E-WASTE recycling to destinations where markets for those materials exist. As most EEE on the South African market is imported, these resources recovered from E-WASTE are typically destined for overseas markets (both the value fractions as well as some of the problematic fractions such as batteries). There are a few known applications where certain materials are used for waste to art projects and by bumper and plastic pole manufacturers who use materials recovered locally from E-WASTE.

To facilitate the required and systematic de-pollution along the entire chain of pre-processes and end processors, South Africa needs technology for e-waste fractions like ABS plastics, chargeable and non-rechargeable batteries, CRT tubes, CFC extraction, fridges and cartridges. It needs to also be noted that there will be more complex embedded materials in future EEE, and the general trend is towards using less metal and more plastic. Technologies for processing new EEE materials will also be required in due course.

Obligations

The key responsibility that is assigned to the end-use recyclers of E-WASTE is that they process E-WASTE in accordance with the BEP / BEPO for materials recovery, and that they promote the use of recycled product or made-from-recycled-materials locally and internationally. Key among the responsibilities of E-WASTE end-use processors and recyclers is their responsibility to promote good E-WASTE recycling practices among the suppliers of their feedstock.

In order to grow and further stimulate South Africa's local (end-use) recycling economy it is important that a viable E-WASTE IndWMP focuses on how these product-making or value-fraction-extracting end-use recycling companies and their plants can be sustained from local E-WASTE stock and in turn, how the materials recovered by them can be beneficially applied to meet the country's own economic development objectives of achieving "inclusive recycling and green job creation from waste". To this end these companies are important stakeholders in the E-WASTE value chain and deserve more support than is currently provided to them. It is hoped that more local benefits can be reaped in future and that South Africa is not forced to sell value fractions that could be recovered by such parties provided the required technologies, costs and standards for processing are within reach and that the stock volumes justify local investments – e.g. as part of building regionalised E-WASTE recovery solutions.

Environmental Compliance

All industries and companies involved in the end-use recovery of resources either for local or international markets are required to register with ERA as an E-WASTE end-use processor /recycler. This is regardless of the percentage of their stock that is derived from E-WASTE.

In order to participate in and benefit from the recycled feed stock produced among accredited E-WASTE recyclers, it is important that they comply with all environmental and municipal legislation required to legally operate their businesses.

It is expected that they comply with the Basel Convention and that they obtain the relevant trans-frontier documentation and export licenses / permissions where necessary. They need to report into the SAWIS database as well.

Company Standards

All legally required company registrations must be in place and complied with. These include the following:

- CIPC (Company Registration)
- SARS (Income Tax, PAYE, UIF, VAT) Registration
- Department of Labour (UIF, Workmen's Compensation, etc.) Registration
- Be at least BBEEE Level 4 Compliant or BBEEE Exempt
- Comply with Second-hand Goods Act

Industry Standards

- ISO 9001 – Operational / Process standard. It is necessary that E-WASTE processors and recycled E-WASTE product producers have ISO 9001 accreditation and/or comply with an ERA-approved equivalent standard.

- ISO 14001 - Environmental standard for E-WASTE. It is compulsory that all E-WASTE processors and recycled E-WASTE product producers have ISO 14001 accreditation specific to E-WASTE processing and specific operational sites.
- ISO 18000 - Health and Safety standard. It is compulsory that all E-WASTE processors and recycled E-WASTE product producers have ISO 18000 accreditation.

Other Conditions and Terms of Operation

There are no conditions that end-use recycler type E-WASTE processors of fractions and/or new product manufacturing need to specifically adhere to except the following:

- Never discard any part of E-WASTE in a general landfill
- Only send E-WASTE to a hazardous landfill or registered recycler
- Adhere to any other standards specified by ERA from time to time

ERA accreditation and adjudication process for registration of E-WASTE End-Use Recyclers/Exporters

The E-WASTE processor applying for accreditation will apply to be registered and accredited as an ERA-approved E-WASTE end-use recycler/processor. The application process will be standardised for ease of use, and applicants will have to provide a reasonably detailed motivation for why they should be incorporated into the ERA accredited E-WASTE management system. The support which they require from ERA and the E-WASTE management sector must be specified, whether this be lobbying for policy change, request for stock flow assistance or plant and technology investment or research requirements. They will also have to demonstrate that they do and/or will align with the practices and standards of operation advocated by the IndWMP.

A special adjudication committee comprising relevant staff, designated ERA board members and independent experts will determine whether the registration and accreditation of the processor is warranted and of benefit to the objectives of the IndWMP.

Accreditation will be based on the following:

- The extent to which the processor applies BEP /BEPO operational standards in their treatment of E-WASTE
- The extent to which the E-WASTE processor meets the relevant ERA standards and criteria in order to qualify for registration / accreditation.
- The extent to which the processor accepts the terms and conditions of accreditation.
- The extent to which the processor accepts relevant E-WASTE fractions from ERA-accredited recyclers and the extent to which it commits to the responsible disposal of the residual E-WASTE to a hazardous landfill site and or transfer to another accredited processor for further processing.
- Demonstration of the processor's willingness and ability to submit the required reports.
- The extent to which the processor is able to present a viable business plan and the required minimum BBBEE rating certificate.
- The extent to which the processor has equipment and infrastructure required to treat E-WASTE in the manner that meets the treatment standards prescribed by ERA.
- The number and level of jobs which will arise as a result of the accreditation / registration of the processor.
- Other criteria to be specified still. Among these criteria will be the processor's ability to provide a competitive price for E-WASTE fractions supplied to it via the IndWMP processes.

Reporting Obligations

Once E-WASTE end-use recyclers/processors have been registered and accredited by ERA, they will be required to provide reports as per reporting requirements stipulated below. They will also be expected to subject themselves to inspection (operations monitoring and data verification) by the Inspectorate and to independent audits to verify their compliance with the terms and conditions of their accreditation, as well as the accuracy of their reports.

The reports from accredited E-WASTE end-use recyclers will as a minimum include the following:

- Taken on E-WASTE materials by source, category and weight
- Specific treatment process described
- The quantity and nature of E-WASTE stockpiled
- Final processed outcome detailed by fraction/material category and the weight of that processed material. This report must also specify the destination to which all fractions/materials categories have been supplied.
- Report on the residual waste generated in the recovery or the recycled product manufacture process and the nature of the residual material by weight, type of residual output and the final destination of that residual output.
- Be at least BBEEE Level 4 Compliant or BBEEE Exempt
- Compliance with E-WASTE treatment regulations and the application of relevant environmental, health and safety standards.

These reports are due on a monthly basis, on the first working day of the new month and must be submitted to the data management company (black box) contracted by ERA to manage such data in a confidential manner. These reports will also serve as invoices for the payment of E-WASTE handling fees due to the E-WASTE end-use recycler and all subsequent Tier 1- Tier 4 recyclers operating further downstream in the value chain and in accordance with the recycling handling fee scale and schedule of payments as discussed in the chapter 10.

Agreements

Accreditation by ERA will be in the form of an agreement between ERA and these E-WASTE end-use recyclers and will specify the conditions under which accreditation / registration has been approved as well as other matters regarding the recording of stock that feeds their materials recovery and recycling processes.

Benefits and Support

The accredited E-WASTE end-use recycler/processor will receive free (and specified) stock quotas delivered from the downstream ERA E-WASTE Tier 1-3 Recycler system.

The quota will be dependent on the top-up E-WASTE stock required over and above what the processor is able to procure by itself. This strategy will be aided by the expanded E-WASTE collection footprint provided by ERA as a result of the bigger network of E-WASTE collection and recycling operations through the planned minimum E-WASTE handling subsidy for Tier 4 Recyclers.

Provision has been made for ERA to help leverage investments sought by end-use recycling processors for the development and installation of E-WASTE processing technologies as required for local beneficiation and treatment of certain E-WASTE fractions and materials.

ERA's research and development programme will involve the direct commissioning of research into E-WASTE processing technologies, business models, business process engineering and a range of other subjects that can benefit individual processors, categories of processors and others in the system. ERA will also support an independent research programme into E-WASTE-related matters.

Overall, the E-WASTE processor should benefit from ERA facilitating firmer governmental positions around the import and export of E-WASTE for beneficiation.

4.8 E-WASTE Transporters

The E-WASTE IndWMP is responding positively to the consistent message from analysts that indicate that E-WASTE management in South Africa is burdened by the absence of dedicated E-WASTE infrastructure and logistics. The cost of transport, in particular, has been singled out as the primary burden on the development of a more robust E-WASTE collection and treatment system.

Since the transportation of E-WASTE is an integral activity for any type of E-WASTE recycler (irrespective of its Tier) or end-use processor, the E-WASTE IndWMP makes provision for setting up a controlled and carefully deployed network of dedicated E-WASTE transporters that will address the logistical and transport hurdles impeding the progress of the E-WASTE collection and treatment system. Provision has been made to stimulate an E-WASTE transporter network that functions on providing transportation services at two primary levels:

a) Transport of E-WASTE from Tier 3 to Tiers 1 and 2 exclusively, and
b) A call-in household E-WASTE collection service for specific classes of E-WASTE such as White Goods to feed E-WASTE recyclers from Tiers 1, 2 and 3.

Transportation of E-WASTE is largely done involuntarily by municipal general waste collection services due to improper disposal of E-WASTE at household level or through private companies contracted to do this on behalf of businesses. Recyclers typically make their own provision for transporting E-WASTE, but the cost of transport means that the reach of E-WASTE recycling services is severely limited to the main urban centres where there is the biggest concentration of E-WASTE recyclers and where E-WASTE transport costs are less onerous.

Obligations

Both levels of E-WASTE transporter services are required to apply to ERA for registration and support in order that they may participate in and secure contracts for providing transportation services to the E-WASTE recycling sector as described above.

In order to qualify for registration/accreditation and for financial and non-financial support as contemplated in the chapter 10, they are required to meet the criteria for such accreditation and support, and also fulfil all contractual arrangements with ERA as defined below.

Environmental Compliance

- Comply with relevant environmental laws required by transporters of E-WASTE
- It is noted that the transportation of hazardous wastes other than E-WASTE might require specialised vehicles and licenses and are not to me mixed with the class of transporter referred to in this Plan.

Company Standards

All legally required company registrations must be acquired complied with. These include the following:

- CIPC (Company Registration)
- SARS (Income Tax, PAYE, UIF, VAT) Registration
- Department of Labour (UIF, Workmen's Compensation, etc.) Registration
- Be at least BBEEE Level 4 Compliant or BBEEE Exempt
- Comply with Second-hand Goods Act regarding source information of transported goods

Industry Standards

The accredited E-WASTE transporter in both services will work according to Operational Standards that will be defined and provided by ERA. The E-WASTE transporter service will be required to ensure that minimum health and safety standards, as defined by ERA are complied with.

Other Conditions and Terms of Operation

In addition to the standards and compliance factors above, all E-WASTE transporter services must commit to adhere to any other operating standards specified by ERA from time to time. Among requirements for registration as an accredited E-WASTE transporter, they must comply with the following conditions:

- They must be trained on the application of the standards and standard operating procedures required, as well as the reporting requirements associated with such accreditation.
- They must not dismantle, recycle, or sell the E-WASTE assigned to their service, and as defined in their contract with ERA, to any company or person other than the one to which they are assigned by ERA and as stated in their contract.
- Among these could be the assignment to undertake E-WASTE collection on a once-off or repeat basis from private and public E-WASTE generation and disposal sources.

ERA accreditation and adjudication process for registration of E-WASTE transporter services

The E-WASTE transporter seeking accreditation will apply to be registered and accredited as an ERA-approved E-WASTE transporter. The application process will be standardised for ease of use, and applicants will be guided and advised by relevant ERA staff on how to meet all of the necessary pre-requisites for registration / accreditation.

A member of the E-WASTE Inspectorate will undertake a due diligence exercise by doing a site visit and records inspection of the E-WASTE transporters' company infrastructure, and assess his /her ability to fulfil all of their obligations as required by ERA. Based on the documents before it, and on the Inspector's report, the adjudication panel, after interviewing the applicant if necessary, will make a determination on whether to approve or defer approval of an application. The reason for deferment will be given in writing, and it will specify what exactly needs to be done to remediate the application for successful registration / accreditation.

Accreditation will be based on the following:

- The extent to which the E-WASTE transporter meets the prerequisite operational standards and certifications required by ERA.
- The extent to which the E-WASTE transporter accepts the terms and conditions of accreditation.
- Demonstration of the E-WASTE transporters' willingness and ability to submit the required reports and administrative requirements of the contract.
- The extent to which the E-WASTE transporter is able to present a viable business Plan and the BBBEE rating of the E-WASTE transporter.
- The extent to which the E-WASTE transporter has equipment and infrastructure required to transport E-WASTE in the manner that meets ERA prescriptions.
- The number and level of jobs which will arise as a result of the accreditation / registration of the E-WASTE transporter.
- Other criteria as developed from time to time.

Reporting Obligations

The accredited and contracted E-WASTE transporter will provide very detailed and specific reports concerning all transactions handled by it. The will include minimally:

- E-WASTE transporter assignment number and details of the assignment
- E-WASTE collected specifying the source from which collected and the weight and/or units for each category of E-WASTE collected.
- E-WASTE collected specifying where it was deposited, and all relevant details as required by ERA.
- The exact distance covered in delivering the assignments as per the odometer reading for the vehicle.
- All of these reports reflect the basic administration associated with each transaction managed by the E-WASTE transporter service.
- All reports must be verified by the source and destination of the E-WASTE and must reflect the signature of the relevant staff so authorised to verify the transaction.
- These reports are due on a daily basis, before the E-WASTE transporter service closes for the day
- These reports / transactional records will also serve as invoices for the payment of E-WASTE transportation services provided to the ERA in accordance with the scale and schedule of payments discussed in the detail of the IndWMP.

Agreements

Accreditation by ERA will be in the form of an agreement between ERA and the E-WASTE transporter service, and will specify the conditions under which accreditation/registration has been approved as well as other contractual arrangements regarding the collection and delivery of E-WASTE.

Benefits and Support

The E-WASTE transporter service will be given collection and delivery assignments on an equitable basis. This means that they will get a fair share of all E-WASTE available for collection at Tier 3 recycler level within their defined zone of operation.

This may be supplemented by additional assignments to collect E-WASTE from various public and private spaces as well as cross-zone assignments where another demarcated zone may be operating without capacity.

They will receive specialised training from ERA or ERA-appointed service providers on the nature of E-WASTE and the special operating standards specified by ERA.

Their work will be specialised and codified, which should place them in good stead to bid for other contracts related to E-WASTE or other waste collection.

They will receive a collection/delivery fee for each kg handled and for each km travelled based on the scale and schedule of payments specified in the detail of the IndWMP.

At the call-in service level, the E-WASTE call-in service providers will be provided with a flat fee per month for two persons, vehicle operating costs support as well as vehicles on a lease-to-own basis, a portion of which is convertible to business support grants depending on their compliance with the terms and conditions of their contracts with ERA, as well as the volumes of E-WASTE which they transport over a specified period of time. They will also receive branded PPE to be used when delivering ERA services to clients.

As discussed, ERA will also lend its support, in a structured manner to assist E-WASTE transporters and call-in collection services to meet the required conditions for accreditation.

4.9 Government

The key role of National Government is to ensure that the co-operation of all role players are fostered and where necessary, enforced and therefore to provide a solid support mechanism to the EPR obligated parties in order to facilitate the efficient, financially viable and transparent roll-out of all envisaged ERA IndWMP based activities and programmes.

In so doing, it will mandate all EEE importers and manufacturers to subscribe to the Plan by registering with ERA, to report on the EEE which they place on the South African market, and to also pay the E-WASTE management levy which is required to implement the Plan.

It must ensure comprehensive levy collection and efficient cash flows to ERA for the implementation of the E-WASTE IndWMP and for managing the system. This is important as many enterprises are dependent on this being the case. This means that the Waste Management Bureau must be functional and have the relevant capacities to facilitate the work of the E-WASTE IndWMP.

It needs to furthermore provide competent leadership and administration with regards to the following issues:

- Ensuring that Waste Management Officers (WMOs) are appointed as provided for in Section 10(3) of the NEMWA (2008).
- Encourage WMOs to co-operate with ERA and the E-WASTE IndWMP. Ideally and where possible, E-WASTE drop-off and buy-back centres need to be located close to municipal landfill sites so as to provide a compliant and accessible place where informal collectors can trade E-WASTE salvaged from landfill sites insofar as these are being brought to the site by municipal waste collection services from households and small businesses.
- Where feasible, ensure effective gate control at Municipal level to divert all E-WASTE from going to landfill.
- Ensure that the SAWIS reporting accommodates relevant E-WASTE data and distinguish the latter from other secondary metals/material (e.g. plastics) sources.
- Give a clear indication of when, how and under which conditions the import of second-hand EEE will be stopped (if at all).
- Give a clear indication whether it will ban the export of EEE in order to provide adequate stock to local E-WASTE beneficiation companies, or whether it will support the sustainability of recyclers by allowing them to trade their EEE on more competitive global markets.
- Similarly, it needs to provide a clear indication of whether it will allow for the importation of EEE from foreign destinations in order to provide adequate stock for local E-WASTE beneficiating industries.
- Stimulate and develop markets for recovered / recycled E-WASTE and products accruing from E-WASTE recycling, both nationally and internationally.
- Align government's own E-WASTE management practices with the E-WASTE IndWMP and as a consumer of EEE, ensure that government EEE is appropriately adding to the local recycling and beneficiation stock.
- Don't unnecessarily limit E-WASTE recycling through restrictive laws on treatment and transportation of E-WASTE, especially.
- Run campaigns to increase consumer awareness about waste recycling
- Ensure that government E-WASTE stockpiles are disposed of through service providers that are registered with ERA as collectors and/or recyclers and as part of the dedicated Tier System.

4.10 Consumers of EEE

4.10.1 Household Consumers

E-WASTE is generated by consumers of EEE, and any strategy for dealing with E-WASTE must clearly spell out the responsibilities that consumers, irrespective of income status, have towards making the Plan work effectively in the interest of good environmental management and economic development.

The concept of "bringing back" any E-WASTE needs to be legally enshrined as a key consumer based responsibility and is the most important support mechanism for the entire ERA accredited E-WASTE recycling value chain to function optimally. It is therefore necessary that all household E-WASTE generators are assisted by all reasonable means to dispose of their E-WASTE in the desired manner e.g. by offering different E-WASTE take-back outlets such as drop-off and buy-back centres. However, for the poor and those located outside of urban centres, this is unrealistic due to the size of some E-WASTE (especially for white goods which accounts for a bulk of domestic E-WASTE), the transport logistics and the cost linked to transportation.

It is for this reason that the IndWMP makes allowance for more accessible E-WASTE drop-off points and collection centres. To pursue this goal of control and channelling E-WASTE flows from household sources, provision has been made for the training, accreditation and logistical support of informal waste collectors to serve residents within the E-WASTE management system.

Also included in the Plan is the creation of a dedicated E-WASTE collection call-in service that will be provided in areas where these drop-off points, buy-back centres and E-WASTE collectors are in short supply. ERA will develop more detailed criteria for who would be eligible for this ERA-funded and ERA-co-ordinated service. Criteria could include, for example, a service to pensioners, people with disabilities and indigent and rural households. However, no allowance is made for the purchase of E-WASTE collected in this manner.

To achieve the requisite consumer consciousness and practice regarding the disposal of E-WASTE, it is especially important that a consistent, effective and accessible message be sent to all consumers that the irresponsible disposal of E-WASTE has negative consequences for the health of people exposed to it and the environment. Equally they need to be made aware that the proper treatment of E-WASTE can generate enterprise, jobs and economic opportunity and ERA accredited service providers and locations (drop off and buy-back centres) in their cities need to be clearly pointed out as part of the deliverables of the Plan and forming part of the public education activities.

4.10.2 Corporate and Public Entity Consumers

It is expected that corporate consumers – business, educational institutions and government - should honour their "bring back obligation" by choosing only ERA-registered E-WASTE collectors and recyclers to dispose of their E-WASTE. The effective incorporation of business consumers of EEE into the ERA accredited E-WASTE management system is critical as their current E-WASTE disposal practices of "selling to the highest bidder" contributes significantly to the problems associated with E-WASTE management regarding cherry-picking and the reckless dumping of no-value fractions in E-WASTE.

In the Phakisa for Chemicals and Waste Management as well as in the WEEE Technology Landscape report[29] it is stated that "currently the main source of E-WASTE 'inputs' (waste) to the recycling sector in South Africa is derived from local and provincial government departments (45%), followed by the business sector (35%) and households (20%). It is further known that many government departments - National, Provincial, and Municipal - are currently still holding large stockpiles of E-WASTE due to the lack of a functioning asset disposal register.

Hence, as a class of consumer, the combined corporate and public sector is believed to cover 80% of all recycled E-WASTE and can make a very significant contribution to consolidating and beneficiating E-WASTE in South Africa.

4.11 ERA E-WASTE Inspectorate

Since the objective of the E-WASTE IndWMP is to gain a good grasp on E-WASTE coming onto the market in order to ensure that it is subjected to the desired handling and recycling protocols, it is necessary that there is appropriate provision made for all stakeholders in the future ERA accredited E-WASTE recycling value chain to be monitored for compliance and to verify data and reports provided to ERA or its contracted 'black box' service provider. Because the E-WASTE management system has a national footprint it is necessary to have a decentralised and independent inspection function so as to have effective verification across the entire E-WASTE management system.

E-WASTE inspectors will be contracted to supply the following services to ERA:

- Undertake due diligence work to assess the extent to which applicants seeking accreditation with ERA have complied with the requirements for such registration and accreditation. They will also be required to assist in the adjudication processes for approval of registration and accreditation.
- Undertake verification work related to the reports submitted by various stakeholders in the E-WASTE management system. As such, they will also be assisting the black box and audit functions of ERA.
- Undertake a general monitoring role in relation to all stakeholders accredited by and registered with ERA.

The Department of Environmental Affairs should have dedicated staff in the Waste Bureau to monitor whether E-WASTE recyclers have the required hazardous waste licenses to operate E-WASTE treatment and collection services. They primarily assess applications made for such licenses prior to issuing them. However, the extent and effectiveness of their monitoring activity is yet unknown.

It is also known that while municipal landfill management is meant to restrict the deposit of E-WASTE on general landfills (until its disposal banned altogether as is the case for lighting already), this is not happening. Unofficial results from recent detailed landfill waste characterisation studies in Cape Town suggest a contamination of 1-2% of E-WASTE in the general waste mix. There is evidence that this is due to households not separating E-WASTE from other municipal waste and due to some E-WASTE recyclers and processors are co-mingling their E-WASTE with general waste in order to avoid paying the required hazardous waste landfill fees for proper treatment of such no value/cost fractions.

[29](Lydall M., Wonder N. , Yulandi J., 2017)

Obligations

ERA E-WASTE inspectors are required to register with ERA and receive accreditation as E-WASTE inspectors. In order to participate in the E-WASTE IndWMP, they are required to meet the criteria for such accreditation and fulfil all their contractual arrangements with ERA as defined below.

Environmental Compliance

An ERA E-WASTE inspector is not required to be licensed in terms of any existing environmental legislation and regulation. However, it would be necessary that an E-WASTE inspection service application be underpinned by a formal tertiary qualification in environmental studies and/or administration / and /or accounting and auditing.

Furthermore, an ERA E-WASTE inspectorate service provider who cannot show these qualifications needs to at least have 5 or more years' experience in managing a monitoring and evaluation function in any industry or business sector. Further environmental compliance parameters will be set by ERA in due course and prior to it contracting any such service.

Company Standards

All legally required company registrations have been obtained and are complied with. These include the following:

- CIPC (Company Registration)
- SARS (Income Tax, PAYE, UIF, VAT) Registration
- Department of Labour (UIF, Workmen's Compensation, etc.) Registration
- Be at least BBEEE Level 4 Compliant or BBEEE Exempt
- ERA will also consider working with sole proprietors, provided that they commit to registering their companies within a specified period.

Industry Standards

Aside from what has already been listed, there are no other applicable industry standards to which an inspector needs to adhere. As discussed, their close association with the due diligence, operations monitoring and reports and data verification functions of ERA requires a certain and demonstrable level of skills and competence. These will be worked into a set of defined criteria by which such contracts will be awarded.

Other Conditions and Terms of Operation

An E-WASTE inspector will minimally require the following:

- Valid driver's license that is older than 3 years
- An insured vehicle
- Live within 50-80km of operational area / clients
- Respect allocated area of operation

ERA accreditation and adjudication process for the registration of ERA E-WASTE Inspectors

The E-WASTE inspector seeking accreditation will apply to be registered and accredited as an ERA approved E-WASTE inspector. The application process will be standardised for ease of use, and applicants will be guided and advised by relevant ERA staff on how to meet all of the necessary pre-requisites for registration / accreditation.

An adjudication panel made up of appropriate ERA staff, as well as the company managing the ERA black box function will undertake a due diligence exercise which will involve minimally a check on the qualifications of the E-WASTE inspector as well as a credit and criminal background check of the applicant. Base on the documents before it, and after a compulsory interview and skills and

psychometric test, the adjudication panel will make a final determination on whether to award registration and accreditation to the applicant.

Accreditation will be based on the following:

- The extent to which the E-WASTE inspector has qualification or experience to discharge of its obligations and functions in the manner required by ERA.
- The extent to which the E-WASTE inspector accepts the terms and conditions of accreditation.
- The extent to which the E-WASTE inspector is willing and capable of providing the reports required by ERA.
- The extent to which the E-WASTE is able to present an appropriate BBBEEE rating
- The extent to which the E-WASTE inspector possesses the means to do his or work without hindrance and logistical impracticalities.
- The number and level of jobs which will arise as a result of the accreditation / registration of the E-WASTE inspector.

Reporting Obligations

The E-WASTE inspector will be available at all times to undertake the work assigned to them, and to provide the required due diligence, data verification, operational monitoring and audit preparation reports for ERA. The frequency of these reports will be dependent on the E-WASTE inspectors' capacity and will be within timelines to be stipulated on an assignment to assignment basis.

Agreements

Accreditation by ERA will be in the form of an agreement between ERA and the E-WASTE inspector and will specify the conditions under which accreditation / registration has been approved as well other contractual arrangements regarding the due diligence, monitoring and verification work to be undertaken by the E-WASTE inspector.

5. Quantities and Types of E-WASTE Generated from EEE Products Locally Manufactured and Imported

5.1 Context

To quantify South Africa's existing and future E-WASTE challenge, it is necessary to quantify its EEE imports and local production of goods that will end up as South African E-WASTE. Data on the amount of EEE placed on the South African market annually, correlated to the average life-span of EEE would therefore be required in order to make more accurate assumptions about the quantity of e-Waste in South Africa.

While Steercom is aware that there is a reliable data source for the importation and local manufacture of EEE through various governmental institutions like SARS, there exists no research or literature in which the entire basket of EEE goods, as covered by this plan, is quantified in units, weight or value for South Africa. Steercom is unable to gain this information from SARS.

Appendix 14 offers a more in-depth analysis of factors that affect the consumption of EEE and thus the generation of E-WASTE and associated E-WASTE management challenges.

5.2 Status Quo

Data and statistics for EEE and resulting e-Waste generation in South Africa are very fractured (and downright contradictory depending on the research report that is referenced for this purpose). As such it does not provide sufficiently accurate and comprehensive quantification at this stage.

The ERA IndWMP seeks to address this gap and it is hoped that better data will become available in due course. At this stage the Steercom can only offer parts-information to provide at best a sense of the challenge. Caution is therefore advised with interpretation of the data given below since it is somewhat outdated, projected and estimated, and also often deals with only a small subset of products and product categories, often for limited geographical areas, and so on.

*Table 2: **Import and e-Waste Data for Some EEE Products for the Period 2003 - 2007**[30]*

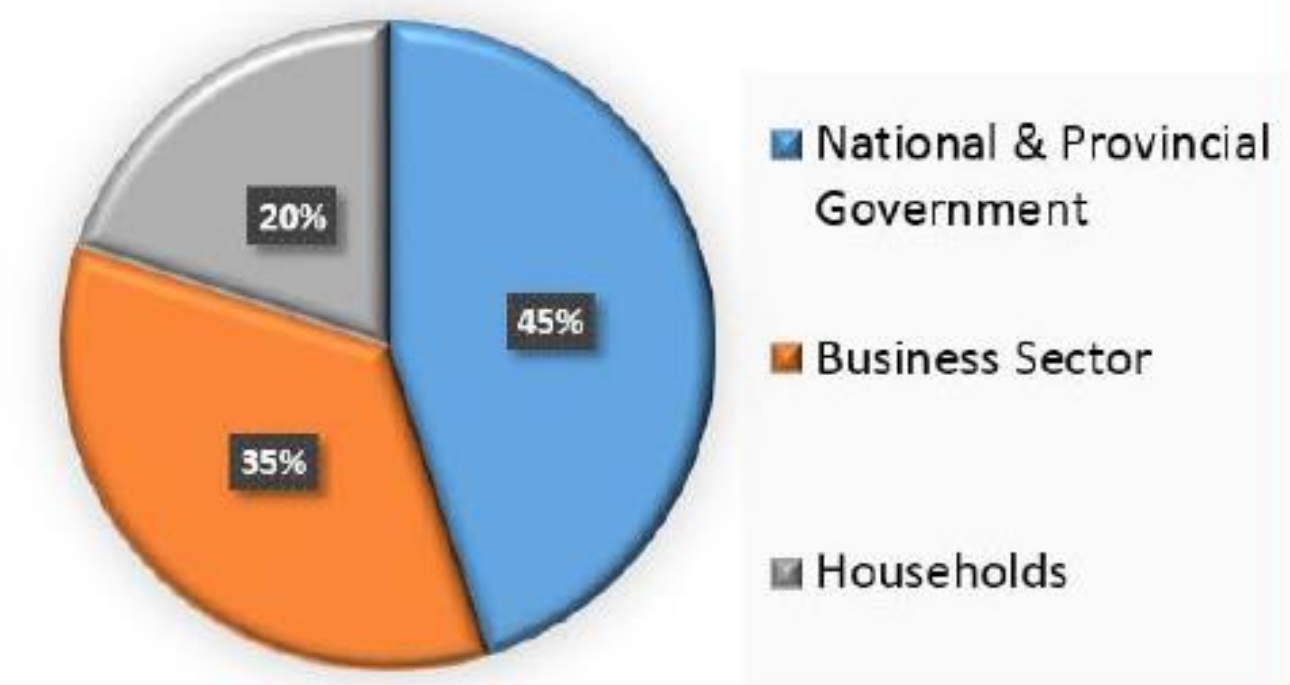
	2003-2007	**2007**	**2003-2007**
Item	Metric tons sold	Metric tons in use	e-Waste generated in metric tons p.a.
PCs	32,000	99,200	19,400
Printers	6,800	-	4,300
Mobile phones	1,900	3,400	850
TVs	35,800	189,000	23,700
Refrigerators	22,300	114,000	11,400
TOTAL	**98,800**	**303,000**	**59,650**

[30](ATE, 2012)

Further desktop research revealed that

- PC refurbishers currently import into South Africa anything from 20,000 to 100,000 units a year.
- Some 60,000 second-hand mobile phones (or 6% of the total) are said to be imported into the country each month. Currently the second-hand ICT market is relatively unregulated[31]
- More than 14 million units of computer equipment were sold in SA in 2008[32].
- There is a difference between what is disposed of by consumers of EEE and that which they no longer use. Some of this e-Waste is stockpiled or stays in circulation through donations to others. Between 1,129,000 and 2,108,000 tons of potential e-Waste is estimated to be held in South African households. This includes white goods, consumer electronics and ICT, most of which is likely to enter the waste stream only in the next 5-10 years[33]. There is very little evidence that this release has happened, and it is reasonable to assume that the accumulated E-WASTE stockpiles in households have grown since then. It is estimated that the top 10% of South African households generate around 85,000 tons of E-WASTE. This can be broken down into the following categories: White goods 64%, Consumer Electronics 17% and ICT 19%.
- The DEA, in 2017 held a Chemicals and Waste Management Phakisa. A key objective of the Phakisa was to "unlock government ICT legacy volumes" in order to respond to E-WASTE Technology Landscape Mapping findings that E-WASTE from government sources could account for as much as 45% of ALL South African E-WASTE that is currently recycled[34] followed by businesses and households.

Figure 2: Sectoral Sources of E-WASTE in South Africa (2015)[35]



[31](Finlay A., 2005)
[32](ATE, 2012)
[33](Finlay A., 2005)
[34](Lydall M., Wonder N. , Yulandi J., 2017)
[35](Lydall M., Wonder N. , Yulandi J., 2017)

5.2.1 South African Current E-WASTE Generation Rates

An estimated 44.7 million tons[36] of E-WASTE is generated worldwide on a yearly basis. However as pointed out in the WEEE Technology Landscape Mapping report for "South Africa specifically accurate data regarding the type, rate and volume of WEEE being generated, in circulation and released for recycling is largely lacking" [37]

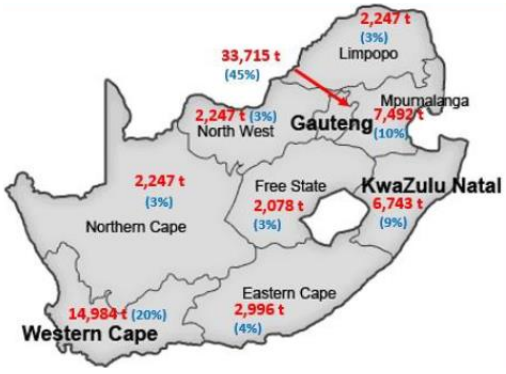
Research by Finlay done for EWASA as a first E-WASTE baseline study of the country estimated that South Africa was generating between 1.12m and 2.1m tons of E-WASTE annually. STEP (2013)[38] suggested a much lower figure of 300,000 tons of which it estimated 18% to be recycled. They estimated that electronic waste in South Africa increases by 10% each year with each person generating around 6.6kg of E-WASTE. In 2011, the DEA estimated as part of the 2012 "National Waste Information Baseline Report that South Africa generated approximately 64,045 tons of E-WASTE p.a. If an annual growth rate of 4% is applied to the DEA's estimates, total volumes produced in 2015 would have been around 74,923tons[39] p.a., but this estimate is widely considered to be too low.

More recent E-WASTE generation estimates provided by the reputable United Nations University (in its 2017 Global e-Waste Monitoring report)[40] suggests that South Africa generates around 300 000 tons of E-WASTE per annum. Green Cape's Waste Market Intelligence research report[41]place the South African E-WASTE generation rates at around 322 000 tons in 2015 and suggests a 12% recycling rate. More E-WASTE data estimates can also be seen in the report published by the GSMA/United Nations[42])

The wide gap in E-WASTE generation estimates has led the Steercom members to apply their collective knowledge to arrive at the negotiated working assumption of this IndWMP, viz. that South Africa currently generates 360,000 tons of e-Waste p.a. The ERA IndWMP also proposes to support the recycling of 26% of all E-WASTE generated by 2023.

The WEEE Landscape Report offers a projection on the distribution of WEEE in South Africa based on municipal disposal figures derived from the DEA. The Steercom Members feel that the overall DEA E-WASTE generation estimates seem low but that picture offers some perspective which shows Gauteng to be the country's biggest E-WASTE generator.

Figure 3: E-WASTE Generation Distribution in South African Provinces according to DEA estimates



[36](Baldé, C. P., Forti, V., Gray, V., Kuehr, R., Stegmann, P., 2017)
[37](Lydall M., Wonder N. , Yulandi J., 2017)
[38](Step, 2013)
[39](Lydall M., Wonder N. , Yulandi J., 2017)
[40](Baldé, C. P., Forti, V., Gray, V., Kuehr, R., Stegmann, P., 2017)
[41](Greencape, 2017)
[42]http://www.gsma.com/latinamerica/wp-content/uploads/2015/11/gsma-unu-ewaste2015-eng.pdf

6. Quantities of E-WASTE: Reused, Recycled or Recovered

6.1 Context

Some stakeholders tend to emphasise the value in E-WASTE while other emphasise the hazardous nature of E-WASTE. These stakeholders and interest groups would tend to point to the one (value) truth or the other (toxic) truth about E-WASTE, depending on the social and economic cost or opportunity associated with one or other position.

The fact remains that there is a global demand for the extracted high value materials in E-WASTE for a number of reasons:

- Scarcity of the critical resources to manufacture new EEE products[43]
- The increasing cost of mining metals from ore motivating the recovery of "secondary metals" instead, and as a "technical nutrient" as envisaged to be the key strategy for a more "circular" economy
- The fact that these materials are needed to manufacture the increasing demand for new EEE

Overall, governments concerned with their populations' health and environmental conditions have taken the view that E-WASTE is hazardous and as such, require that special measures be taken by all stakeholders when dealing with the manufacture of EEE and the management of E-WASTE. At the same time, they also acknowledge that E-WASTE has the unique potential to bring huge economic and social benefit when managed properly and with due consideration of their populations' health and environmental rights. Much of the contextual analysis dealing with government policy and legislation as well as international convention reflects the South African governments' acknowledgement of the opportunities and risks associated with E-WASTE and its attempts to minimize the risks and maximize the benefits.

It has been said in numerous reports and studies on E-WASTE in South Africa that South Africa has a well-established E-WASTE recycling sector. This is partly true in that the high value metals and precious metals from E-WASTE have long been traded on a prolific and profitable basis. The size of the South African scrap metal industry and the volumes of scrap metal from E-WASTE (and particularly high value PCB boards) traded over the last decade seemingly affirm that scrap metal recycling is indeed well established. However, such an assertion conflates the recycling of scrap metals from E-WASTE with full and proper E-WASTE recycling.

In addition to the maturity and size of the scrap metal industry in South Africa, the fact that an increasing number of informal waste pickers are handling E-WASTE in increasingly larger volumes is held as proof that E-WASTE is valuable and that this value is increasingly being realized by the informal waste collectors.

What follows is a closer look at the general situation of how E-WASTE is currently being managed in South Africa regarding its re-use; recycling and recovery:

6.2 Status Quo

E-WASTE in South Africa is currently destined (if it has re-use or recycling / material recovery value) to end up in one or more of the following places:

[43] Rare earth metals of which very little is actually recovered and recycled at all

- Trade points like a refurbisher or repair shops who fix and resell and therefore recover either the entire unit or at least component-based functionality; or
- E-WASTE or scrap metal recyclers (dismantlers and sorters) for the recovery of functional components and the liberation of value fractions); and then onto
- Recyclers that extricate value materials from non-value materials further - e.g. my means of mechanical separation
- End-use processors that further concentrate and recover high value materials for product re-use

Typically, any value accumulation happens along the E-WASTE value chain starting at the collector, and then increases along recyclers that operate under conditions as described in Chapter 4.3-4.5 for Tier 1-3 until the end-use recycler/processor is reached for the recovery of materials. However, the highest profit margins overall is achieved when recovery of function can be achieved - when equipment can be used in its entirety and full functionality. Selected functionality through component re-use provides the second best financial returns.

In alignment with government, the Steercom Members' strategic position and planning horizon for the IndWMP can be summed up in its promotion of the waste hierarchy as follows:

- Reduce (toxins in E-WASTE and volumes of E-WASTE)
- Re-use (refurbish, repair, remanufacture or find other gainful uses)
- Recycle / Process/ Recover (all stages of the recycling sequence), and
- The lawful disposal of E-WASTE

6.2.1 Source Reduction Measures

Producers, as the "obligated parties" to finance and manage the take-back of all E-WASTE for safe and environmentally friendly treatment want South African EEE consumers and other E-WASTE stakeholders to know that they are responding to RoHS directives and that they are working on finding ways to avoid hazardous substances in their manufacturing processes. The following, quoted from the original draft ITA IndWMP illustrates this point:

- The majority of OEM/EEE producer's product is designed and manufactured to meet global requirements. International standards applicable to product marking and material regulations such as CE product marking and best practice RoHS (Restriction of Hazardous Substances) legislation already ensures the phasing out and restriction of hazardous materials in addition to producers own voluntary restriction programmes. Product marking requirements assist in terms of awareness to avoid WEEE from being dropped in garbage bins containing waste destined for disposal.
- Additionally, the majority of OEM producers also have disassembly instructions and supplementary end-of-life information for recycling and treatment facilities of their products. Manufacturers' product dismantling instructions identify components and materials and the location of hazardous substances (if any).
- Producers have invested significantly in Design for the Environment (DFE) and Product Stewardship programmes that focus on reducing the environmental impact of their products

Both international and locally based "Producers" have pointed out their ongoing efforts over many years to make their products lighter, less toxic and more reusable and recyclable. This is acknowledged and encouraged but the expected impact cannot yet be quantified in South Africa.

It is furthermore required that producers subscribing to the ERA Plan will work towards the reduction of harmful materials in the manufacture of their products, and in particular, to ensure that all materials used in the manufacture of EEE can be sustainably recycled at end of life. Producers placing product on the South Africa market should ensure that the products comply with chemical and material restrictions in the European Union RoHS Directive. The South African government may also decide to regulate these same requirements in future, and as such, will be incorporated into the responsibilities assigned to EEE producers who are subscribed to this E-WASTE IndWMP.

6.2.2 Re-use Measures

The refurbishment of E-WASTE for re-use is an important factor supporting effective E-WASTE management and refurbishment enterprises and trade that needs to be encouraged. Refurbished IT equipment, in particular, contributes to the other important social and economic objective of aiding the digital inclusion of poorer communities and individuals by making EEE more affordable.

There are a number of factors that need to be noted in relation to this particular stakeholder in the E-WASTE management process:

- IT refurbishers are sourcing a large part of their stock through the importation of second hand EEE assets.
- Some of these imports are compliant with the provisions of the Basel Convention which stipulates the conditions for transboundary trade in E-WASTE. The assets imported for refurbishment are either bought or donated assets.
- It has also been acknowledged that there is a proliferation of IT refurbishment enterprises, and it is likely that many of these smaller enterprises are involved in the illegal import of cheap second-hand IT equipment.

It is planned that imported second-hand EEE would equitably and proportionately contribute to the funding of the E-WASTE Management Plan. However, the shortened life-span of cheaper second-hand imports may contribute disproportionately to the rate of E-WASTE generation in the South African market.

6.2.3 Recycling Measures

Formal E-WASTE Recyclers

It is important to state that there are currently no E-WASTE recyclers in South Africa who go beyond "pre-processing". This includes the dismantling, sorting, separation and baling of homogenous or near homogenous fractions of E-WASTE. Some of the larger Tier 1 type recyclers shred, pulverise and granulate E-WASTE in order to maximise load and transport efficiencies, but none are known to apply any form of metallurgical processing for secondary metals recovery. These metal recovery treatments are (sometimes in combination) the following:

- chemical (hydrometallurgical)
- thermal (pyrometallurgical), or
- electrical (electrometallurgical).

According to the Green Cape Market Intelligence Report 2017[44], twenty companies (including refurbishers, recyclers and metal extractors) collectively processed 45,000 tons (amounting to 12%) all E-WASTE generated in 2016. The reports states that EWASA estimates the total E-WASTE generated was 320,000 tons in 2015, with various categories of E-WASTE contributing as follows:

[44](Greencape, 2017)

Figure 4: Percentages of E-WASTE Categories Recycled in 2015

e-Waste classification	Tonnes	Percentage recycled
Large appliances (stoves, fridges)	125 000	39%
Consumer equipment	78 000	24%
Information technology (IT) equipment	77 000	24%
Small household appliances (toasters, kettles, etc.)	40 000	13%

Fractions and materials received from these E-WASTE categories via Tier 4- Tier 1 Recyclers are sold to scrap metal processors, refineries and overseas markets that act as the end-use recycler/ processor. These processors possess technologies to maximise profits for the high value fractions (e.g. smelting, remanufacturing or new product development), and also the treatment of no/low value fractions (e.g. heavy metal containing batteries).

It is important to discuss briefly why in the consolidated opinion of the ERA Steercom Members the South African scrap metal recycling industry (in its current shape) is excluded from the definition of E-WASTE recycler and hence not be eligible to any IndWMP benefits. Most obvious among these reasons is that their foray into E-WASTE recycling is very limited. E-Waste comprises a very small percentage of their overall trade.[45] Their interest and trade in E-WASTE also only extends to metals such as copper, aluminium and steel, etc. Their procurement preferences tend to be limited to these selective E-WASTE fractions, which encourages inappropriate and illegal treatment methods among informal E-WASTE collectors. Scrap metal dealers should be discouraged from dismantling E-WASTE or accepting E-WASTE fractions that were inappropriately recycled, this despite the largest of them operating in a legally compliant manner and applying high EH&S standards onsite.

When the scrap metal recycling sector is (correctly) omitted as key stakeholders in the E-WASTE management process, there are only about 7 large specialised E-WASTE recyclers in the country that largely fulfil the Tier 1 recycler requirements of this IndWMP. The WEEE Technology Landscape Mapping report states that in 2015, approximately 17,733 tons of WEEE was handled by 27 firms, but this study included the largest scrap metal dealer as well as businesses which are not considered by Steercom to operate formally enough. The larger specialised E-WASTE recyclers each handle between 2,000 and 5,000 tons of E-WASTE per annum.

[45]Informal discussions with the largest scrap metal merchant in Cape Town suggest no more than 6-10% of the metals they process on average to be derived from WEEE

The known and formally registered small and medium sized E-WASTE recyclers that have emerged over the last 5 to 10 years operate in varying states of compliance and they number, according to the Landscape report,[46] to around 100 WEEE recyclers. A number of them are also in start-up or experimental phase. To this end Steercom will work with a number of at least 50 Tier 2-type recyclers. Steercom has determined that a medium sized E-WASTE recycler manages between 50 and 500 tons of E-WASTE per annum, while a small E-WASTE recycler manages on average somewhere between 6 to 20 tons of E-WASTE per annum.

The common thread that binds Tier 1 and Tier 2 type E-WASTE recyclers is that they support the compliant and accountable processing of E-WASTE and they strive, or appear to strive to be compliant with global best practice in E-WASTE recycling.

The EWASA E-WASTE Assessment of South Africa Study[47]says of the E-WASTE recyclers that they interviewed:

> *"... a number of recyclers interviewed took some level of care regarding the environmental impact of their recycling processes"*

The same study notes that of the 10 recyclers interviewed; only one was ISO 14001 compliant and further observed the following with regard to their environmentally problematic practices:

- Mechanical shredding of monitors and fridges which releases ozone-depleting and greenhouse gasses was observed
- Stockpiling of hazardous fraction is taking place
- The passing of hazardous fraction to other recyclers without tracing their fate is happening. For example, one recycler insists that batteries are removed from IT waste before recycling, but cannot account for what happens to those batteries.
- Landfilling potentially hazardous plastics for which no market can be found
- E-WASTE is exposed to rain
- Many recyclers do not treat effluent / leaching water or test landfill fraction for toxicity
- In the absence of storage space, especially for bulky white goods, recyclers insist of receiving only fractions of value (metal).
- The bulk of E-WASTE recyclers / processors are only interested in certain E-WASTE components.
- On-site incineration of E-WASTE was reported
- There is also some degree of category specialization, with some E-WASTE recyclers specializing only in specific E-WASTE categories.
- The recycling processes amongst the current operators are not uniform, and include pre-processing by manual dismantling and mechanised shredding. Manual dismantling is a value-add process that allows different markets to be found for the separated fraction.

While the original baseline study was done in 2005, it seems that even 13 years later many of the challenges have remained unaddressed will therefore be receiving attention when executing the ERA IndWMP objectives.

End-Use Recyclers/Processors

These service providers are the final vendor and processing arm of the industry (product manufacturers, refiners and smelters) who buy the fractions (copper, plastics, metals, gold, etc.) supplied by the pre-processors of E-WASTE - typically in the form of particle reduced (shredded) material provided by Tier 1 type recyclers.

[46](Lydall M., Wonder N. , Yulandi J., 2017)
[47](Finlay A., 2005)

As an end-user in the E-WASTE recycling chain, they seldom directly deal with or are involved in the irresponsible practices characterizing mostly Tier 3 and Tier 4 Recyclers' pre-processing practices. They are, however, indirectly at the heart of the poor recycling practices insofar as they demand very specialized and homogenous fractions of particular E-WASTE components and constituents for their recovery processes.

The end-use recycler operations actually involved in the recovery of secondary metals from E-WASTE are very limited in South Africa. The two known to exist are SA Precious Metals and Rand Refinery[48]

Rand Refinery

Due to the gold content in printed circuit boards, Rand Refinery is considering it as a viable resource for smelting and refining. It expects 5% growth in its E-WASTE throughput annually. Its smelter capacity will be increased from 2,000 tons p.a. to 6,000 tons p.a.

According to the WEEE Technology Landscape Mapping report "Rand Refinery's smelter has a fluidised bed incinerator capable of treating approximately 1,500 tons of material per annum - including by-products from the mining industry, E-WASTE, carbon fibres and sludge. At the time of its investigation into the viability of reconfiguring its precious metal refinery to include PCBs (2000-2007), it envisaged developing a plant with the processing capacity of 4 tons per day."[49]

SA Precious Metals

SA Precious Metals recently developed a hydrometallurgical processing alternative and claims it is comparable with precious metals recovery efficiencies attained by international state of the art smelters such as Umicore in Belgium and Boliden in Sweden.

"SA Precious Metals Ltd has developed a hydrometallurgical PCB refining solution with the capacity to process approximately 2 tons of PCB materials per day. The plant's PCB refining capacity is small when compared to the current PCB production volumes in the country (estimated at around 7,000 to 10,000 tons), but it can be scaled up to 4 tons per day once a consistent supply of PCB materials is secured. As it is modular, it can also be established across the country, in proximity to established PCB consolidation points."[50]

Key Challenges Observed in End-Use Recycling of Metals

It has been reported in numerous publications[51], that the volume of E-WASTE reaching these role players does not support the "economies of scale" required to establish large E-WASTE processing plants. Not all of the E-WASTE generated in the country ends up at the processors' premises. Some E-WASTE ends up in more profitable foreign markets and some quantity is lost through illegal dumping.[52]

The common view is that the correct regulatory framework with clearly defined stakeholders in the E-WASTE value chain (distinguished between pre-processing and processing businesses) as discussed in the 2017 WEEE landscape report (Lydall M., Wonder N. , Yulandi J., 2017), would help to facilitate the more efficient collection of large volumes of E-WASTE for processing plants locally. The development of South Africa as a regional solution hub to recover certain fractions (and their value)

[48](Lydall M., Wonder N. , Yulandi J., 2017)
[49](Lydall M., Wonder N. , Yulandi J., 2017)
[50](Lydall M., Wonder N. , Yulandi J., 2017)
[51](ATE, 2012)
[52](ATE, 2012)

in South Africa[53] must be encouraged. Other fractions, however, may be more efficiently recovered in overseas facilities in state of the art smelters that can recover up to 17 different elements contained in a PCB - as found in Europe. The free-flow of both types of fractions should be encouraged and onerous export/import limitations should be discouraged.

The metals recovery process through end-recycling/processing has many benefits. Among them are the following:

- Recycling can significantly reduce the demand for virgin metals. Recycling means that less money and energy has to be expended for the mining of the various minerals which are consumed during the EEE equipment manufacturing process.
- Primary production - mining, concentrating, smelting and refining - especially of precious and special metals has a significant carbon dioxide (CO2) impact due to the low concentration of these metals in the ores and due to the often difficult mining conditions. "Mining" of old phones or old computers to recover metals, if done in an environmentally sound and correct manner, needs only a fraction of the energy required to mining ores in nature.

Other E-WASTE Recycling Applications

Apart from these key local E-WASTE processers a few other processing options exist that utilise distinct and limited E-WASTE components for the purpose of waste beneficiation including:

- Waste to Art Projects
- Jewellery
- Car bumper manufacture from recycled plastic
- Fence poles
- Other injection moulded plastic products (still in R&D stage)
- PCB-free oil recovery for reuse

6.2.4 Recovery Measures (Collection and Take-Back)

Municipal

No municipalities or private service providers provide a specialist kerb-side E-WASTE collection service, so there is no encouragement for households to separate E-WASTE from general household waste. Insofar as municipal services do collect E-WASTE (with household waste), they dispose of it at general landfill sites and they do not engage in recycling for E-WASTE. The exception is a couple of garden sites that accept E-WASTE drop-off and which allows for high value fractions to be picked by informal waste collectors. Inevitably the low / no value fractions are left behind for general landfill disposal.

Business to Business (B2B)

Some EEE manufacturers and distributors have E-WASTE take-back, re-use and recycling programmes in place for their business customers. It is generally agreed amongst Steercom Members that there is greater control over the destiny of E-WASTE deriving from this source. It has also been stated by some analysts that, apart from E-WASTE generated from 'brand products' whose manufacturers and dealers are participating in voluntary EPR programmes, the bulk of E-WASTE generated have no specified routes for processing. The majority of these individuals and companies purporting to be

[53]Electronics account for almost 80% of the world's demand for indium (transparent conductive layers in LCD glass), over 80% of ruthenium demand (magnetic properties in hard disks) and 50% of the demand for antimony (flame retardants). Some of these metals are also important for renewable energy generation: selenium, tellurium and indium are used in thin film photovoltaic panels. Platinum and ruthenium are used for proton exchange membrane in fuel cells.

involved in recycling or processing E-WASTE are only interested in certain components of the bulk of E-WASTE generated.[54]

After government, the corporate sector is the second largest consumer of IT and generator of E-WASTE originating from ICT equipment. Some EEE producers provide an E-WASTE collection and IT asset replacement service (either as part of EPR programmes or as part of their leasing model). Not much has been explicitly revealed about how much is collected and what happens to the E-WASTE that they collect through these voluntary programmes or commercial arrangements.

It would seem that the E-WASTE collected by EEE producers and distributors tend to be sold off to E-WASTE recyclers whose standards of operation approximate those found in the developed countries from whence the EEE originated. This is in large part due to their need to comply with their global corporate standards and policies and other globally recognised recycling standards.

There is also some evidence that some of these assets are refurbished and find an extended life in the same or similar organisations, or in a charity or social development organisation.

The E-WASTE collected by the manufacturers and suppliers of IT product from the business environment tend to have more value than household E-WASTE and is generally managed effectively through specific business to business recycling programmes so as not to add adverse environmental impact. However, as much as these programmes are acclaimed for their contribution to saving the environment, very little data has surfaced (through numerous E-WASTE studies) about the volumes of E-WASTE handled through these mechanisms.

Formal public take-back structures and programmes

According to the initial EWASA Baseline Report[55] around 600 E-WASTE consumer programmes/ drop-of points are available country wide where any type of consumer can dispose of E-WASTE in a controlled manner which can be subsequently recovered for either reuse, refurbishment/repair, recycling or disposal purposes.

- Producer/Retailer E-WASTE Collection Points: Example: Samsung, Makro and Nokia
- Over 10 Gauteng and Western Cape Municipal E-WASTE drop off sites (each)
- Over 25 Gauteng Pikitup garden refuse sites
- Buy-back promotions. Example: Incredible Connection and HiFi Corporation
- Company specific national e-waste collection days (e.g. JG Afrika)
- Governmental Household Hazardous Waste events that also includes E-WASTE (Stellenbosch Municipality)
- Collection events for selected ICT in shopping malls (e.g.as facilitated via Squaremobile)
- Dedicated Retailer based E-WASTE Drop-off points. Example: Pick and Pay, Builders Warehouse and Woolworths.
- Dedicated Academic institutions E-WASTE Collection points. Example: UNISA, University of Stellenbosch and University of Cape Town.
- Online free consumer recycling programme. Example: Dell for equipment replaced by new purchase or end of life Dell equipment.

[54](ATE, 2012)
[55](Finlay A., 2005)

A number of middle-class and/or environmentally conscientious households are increasingly depositing their E-WASTE at specialized E-WASTE collection points and buy-back centres. As discussed, these have largely been provided by retailers of EEE and are located at EEE retail facilities as part of the retailers extended producer responsibility for E-WASTE. A number of these drop-off and buy-back facilities are set up jointly by retailers and importers of EEE, and in some instances in conjunction with specialist E-WASTE recyclers.

However, the households that use the drop-off disposal method for E-WASTE are still a small but growing minority as evidenced by the E-WASTE collected by these facilities.

While it is a positive development that needs to be encouraged, there are a number of limitations to the efficacy of these programmes and facilities that need to be considered when designing the E-WASTE IndWMP. These are:

- There is an insufficient distribution of these facilities. They are mainly located in urban centres and are inaccessible to many of the urban and rural poor due to transport costs and the logistics of carrying bulk items by public transport
- Many of these facilities (especially where offered in a retail environment) cannot accommodate the larger household appliances like fridges and washing machines due to the premium on floor space.
- Some facilities will only do trade-ins and require the purchase of new EEE before they take back E-WASTE and sometimes the trade-in requirements are brand-specific.
- The E-WASTE deposited at uncontrolled drop-off points is vulnerable to vandalism and theft (as often happens) and very often only the low value fractions are found in these receptacles.
- The overall contribution which these drop-off points make towards the controlled collection of E-WASTE is in the region of 5% of the E-WASTE which is accountably recycled and processed, and less than 1% of the total estimated E-WASTE generated annually (based on facts stated in the meeting minutes of EWASA.)

Informal EEE collection and recycling

Much of the dangerous practices associated with E-WASTE mismanagement are practiced by informal collectors who pick through household, lying-around and dumpsite waste for all waste of value.

From the notes provided by the Parliamentary Monitoring Group[56] it was shared at the Phakisa Chemicals and Waste Management in 2017 that "the SA Waste Pickers Association registered about 90,000 waste pickers".

As pointed out in Chapter 10, it is assumed that about 10,000 pickers engage in E-WASTE collection while gathering other metal, paper and plastic waste for resale to recyclers, and that about 2,000 pickers are regular E-WASTE collectors.

The informal type of waste collector is known to crudely process E-WASTE by inappropriately extracting the higher value materials for trade with scrap metal dealers and E-WASTE recyclers. On average and from empirical Steercom Member knowledge they realise between R1.20 and R2.00 per kg of E-WASTE.

In their attempt to cherry-pick and separate sellable E-WASTE fractions, these individuals are known to engage in hazardous practices which compromise their own health and safety and that of the communities and people around them. Among their negative E-WASTE recycling practices are the following:

[56]https://pmg.org.za/committee-meeting/25240/

- Open burning of plastic mantling – to extract copper value from cables
- Ripping out of hard-drives from PC units
- Smashing of CRT monitors to extract the copper coil
- Smashing E-WASTE that contains Printed Circuit Boards (PCBs)

In the process of opening up E-WASTE in an uncontrolled and forceful way their health and safety is at risk due to:

- General exposure to hazardous substances
- Danger of physical injury due to lack of basic safety equipment and safety measures when handling waste
- Lack of knowledge on where hazardous components are located in certain types of E-WASTE
- Lack of knowledge on the risks associated with engaging in certain practices and what the safe alternatives look like.

While accounting for as much as 25% of all the E-WASTE that finds its way to recyclers[57]such individuals are also highly vulnerable when negotiating prices with the scrap metal dealers and recyclers buying their sellable fractions as these smaller companies often play the role of the middleman who on-sell the consolidated materials to the Tier 1 and end-recyclers and who take a big cut of the profits to be made.

E-WASTE is unlikely to be a primary waste stream for informal collectors and recyclers as it is not easy to access most of the time. They typically work with a range of recyclables like cardboard, glass, scrap metal, as well as old electronics that can be sold for repair. The development of programmes for informal waste sector integration, where they can sell their E-WASTE materials at fair market prices to accessible buy back centres, is important.

[57](Lydall M., Wonder N. , Yulandi J., 2017)

7. Quantities of E-WASTE: Disposed Of

7.1 Context

The 2008 EWASA initiated South African e-Waste Assessment notes that few accurate statistics exist regarding how much e-waste ends up in municipal landfill. Tshwane Metro has indicated that up to 5% of their landfill waste volumes are comprised of E-WASTE. The 2004 study by Widmer and Lombard also quotes a figure of 2.2 tons of E-WASTE per month being deposited at one landfill in Ekurhuleni in Gauteng[58]. However, the latter statement does not provide any indication of the percentage of E-WASTE that would constitute the total waste volume disposed of there. The latest, extensive and detailed waste characterization study by the City of Cape Town produced new primary data that suggests that Cape Town's remaining landfills receive on average about 0.5% to 2% of all waste as E-WASTE. The numbers estimated by Lombard and Widmer appear to be too high and it can be assumed that E-WASTE accounts for around 2% of landfill space for other comparably sized cities as well.

If E-WASTE (or derivative fractions or materials in E-WASTE) has no actual or perceived value or is problematic to handle, then it goes to:

- Ideally and at considerable cost to an authorized local hazardous landfill or end-treatment site; or
- Illegally onto a general landfill site[59]; or
- Illegal dumpsites, open spaces, green sites and water ways in uncontrolled dumping
- Is exported to locations beyond the country's borders for further treatment and/or safe disposal; or
- Is stockpiled / stored for whatever reason, but generally on the assumption that it might be reused or, that in time, some monetary or other value can be derived from it – like making a donation to family, friends, workers or charity.

There are no markets for the no/low value fractions that cannot be used in the manufacture of new EEE or other goods. The same applies to E-WASTE with high toxic loads. This problem tends to be transferred to our environment through illegal disposal methods like burning, dumping or Landfilling.

In the case of E-WASTE from the Northern Hemisphere - European and US sources - there are examples where WEEE and problematic E-WASTE fractions were illegally sent, under the guise of charity donations, to foreign (Asian/African) destinations where the problem is easier to deal with due to an absence of legislation, standards, systems and controls in managing the problematic side of E-WASTE.

It is certain that like in the rest of the world, significant volumes of E-WASTE is fed into the South African scrap metal industry, and it is equally certain that the extraction of valuable fractions from E-WASTE have resulted in the extrication of very sizable volumes of low or no value fractions. The question that follows then is, "what currently happens to these no/low value non-traded/tradable fractions?"

[58](Finlay A., 2008)

[59]WEEE in Cape Town landfills constitutes 1-2% of the total mix (estimated visually) and comprises mostly of broken plastic encasings and battery waste.

7.2 Status Quo

Hazardous landfill sites and low / no value E-WASTE fractions

Since E-WASTE is classified as hazardous, one should be able to quantify the volume of untraded fractions by assessing the E-WASTE received at legally compliant hazardous landfill sites – this being the place where hazardous waste must end up. It appears that problematic E-WASTE is not finding its way to these landfill sites. This situation is further exacerbated by the fact that the DEA timelines for the prohibition of E-WASTE disposal in municipal landfill sites as flagged in the *Waste Classification and Management Regulations and Supporting Norms & Standards (2013)* document [60] will only be implemented by 2021. The ban on all lamp disposal in landfills was already implemented in August 2016.

There is also no evidence, aside from the obvious E-WASTE fractions like CRT glass, that legal hazardous landfill sites are currently being used to dispose of the E-WASTE fractions that are currently not traded. There simply is no counter-balancing figure available, as should be expected, at legally compliant hazardous landfill sites. The primary reason that the evidence of collateral E-WASTE (low value) finding their way to a hazardous landfill site is missing has very likely to do with the following known issues:

- The poor distribution of hazardous landfill sites across the country as it is expensive to establish and operate such sites and to transport E-WASTE to there.
- The disposal cost of placing E-WASTE into hazardous landfill sites makes it prohibitive, from the lowest rungs of the E-WASTE recycling industry (waste pickers), to the powerful scrap metal recycling industry, and to some among that handful of specialist E-WASTE recyclers.
- Because of the high costs associated with the legal disposal of hazardous E-WASTE, informal recyclers are encouraged by the up-stream recyclers along Tier 1-3 to extricate the higher value tradable E-WASTE by whatever means necessary, as long as it does not become their responsibility as the waste buyer.
- It has also been observed that some E-WASTE recyclers have been known to:
    - reject low value and problematic E-WASTE like CRT monitors;
    - accept E-WASTE, extricate the value fractions and stockpile the residual low value fractions, or export it to where there is a market for that material;
    - alternatively, as known by Steercom Members, they camouflage the low value fractions (by crushing and/or mixing it with other waste) and dispose of it at much cheaper general landfill sites; and/or
    - accept only the high value fractions without regard to what happened to the other (low value) yield from the same E-WASTE

7.2.1 General Municipal Landfill and Disposal of E-WASTE Fractions

There is increasing evidence that some low / no value E-WASTE is ending up in general landfill sites across the country. It is hard to quantify just how much of this is happening due to the following:

A few landfill managers have observed and noted the increasing inflow of E-WASTE as a proportion of the general waste disposed of at their sites. From a waste characterisation study that was undertaken by the City of Cape Town at two general waste landfill sites it could be seen that E-WASTE constituted an average of 1% to 2% of the waste brought to landfill. These are informal

[60] http://sawic.environment.gov.za/documents/2177.pdf

observations at this stage and can therefore not (yet) be referenced. However, the systematic monitoring of E-WASTE quantities is not happening routinely or systematically as it is a relatively new waste stream.

- The Steercom estimates that only about a quarter of general / municipal landfill sites in the country operate to a sufficient standard and have sufficient infrastructure to be able to accurately measure any waste streams and E-WASTE specific inflows are never recorded[61]
- E-WASTE does not form part of the waste matrix that is being reported upon in the South African Waste Information System and as the data is not required, it is not measured;
- E-WASTE is often camouflaged or otherwise co-mingled with other general waste when it arrives from recyclers;
- Smaller E-WASTE generally arrives at the landfill site co-mingled with general household waste as it is common practice to dispose of small household appliances in this manner via the household/business municipal waste bin;
- Auctioneers buy corporate EEE assets (both functional and non-functional) and often cannibalised [62] and co-mingled with other assets, and after optimising their repair/refurbishment potential and/or realising the scrap metal value, they also camouflage and co-mingle the E-WASTE with general waste.

Having said the above, it is also true that E-WASTE is scavenged for repair and re-use or for scrap metal by the multitude of informal waste collectors that have come to occupy the landfill sites for livelihood purposes. It is for this reason that it is not easily detected in the landfill as the remaining fractions are hard to identify as E-WASTE. There are almost certainly no metal fractions (from E-WASTE) that can be observed at landfill sites due to their intrinsic value.

7.2.2 Current E-WASTE Disposal Practices

Households

Most households studied for[63] their E-WASTE disposal practices indicated that they do one or more of the following with their E-WASTE:

- Drop off at specialized E-WASTE collection / drop-off sites;
- Co-mingle smaller household appliance E-WASTE with general household solid waste that is collected by municipal service as general waste collection;
- Donate to family, friends, workers or charities;
- Store in anticipation of future use, or sale for scrap value.

There are also fairly strong indicators that household practices around the disposal of E-WASTE is influenced by a lack of understanding of E-WASTE and its potential impact on the environment, as well as the lack of knowledge about where to dispose of it compliantly, or by not having access to the proper infrastructure to dispose of E-WASTE.

Government

Unless government based E-WASTE is refurbished for internal re-use or to get donated/ sold off (e.g. to other Departments or public facilities) the following E-WASTE disposal options are known to be applied by South African government institutions:

- E-WASTE is thrown out with general waste;

[61] unless a waste characterisation study is undertaken at some stage by a Municipality

[62] This term is used to describe the practice used routinely by company staff with access to end-of life EEE of removing valuable components e.g. hard drives from the remaining equipment (e.g. PC unit)

[63] (Finlay A., 2005)

- E-WASTE is auctioned off with non-EEE office equipment and furniture;
- E-WASTE is temporarily stored (stockpiled) until there is an urgent need for space, or when asset registers need to be balanced, and then auctioned off.

It is uncommon for government to be able to account for the final destiny of their E-WASTE as E-WASTE controls and standards do not feature as a criterion for E-WASTE service provider appointment. The Municipal Finances Management Act (MFMA) and Provincial (PFMA) requirements for the disposal of end-of-life assets largely dictate the process followed by government when disposing of its E-WASTE. With the prevailing scenario and given that government in South Africa account for 45% of all E-WASTE that reaches formally operating recyclers[64] the scope for "sustainable procurement" needs to be investigated and strongly motivated. Upon implementation of the ERA plan all E-WASTE generated by government should be managed and treated by ERA accredited refurbishers and recyclers.

[64](Lydall M., Wonder N. , Yulandi J., 2017)

8. The Waste Management Hierarchy and How the ERA IndWMP is Giving Effect to It

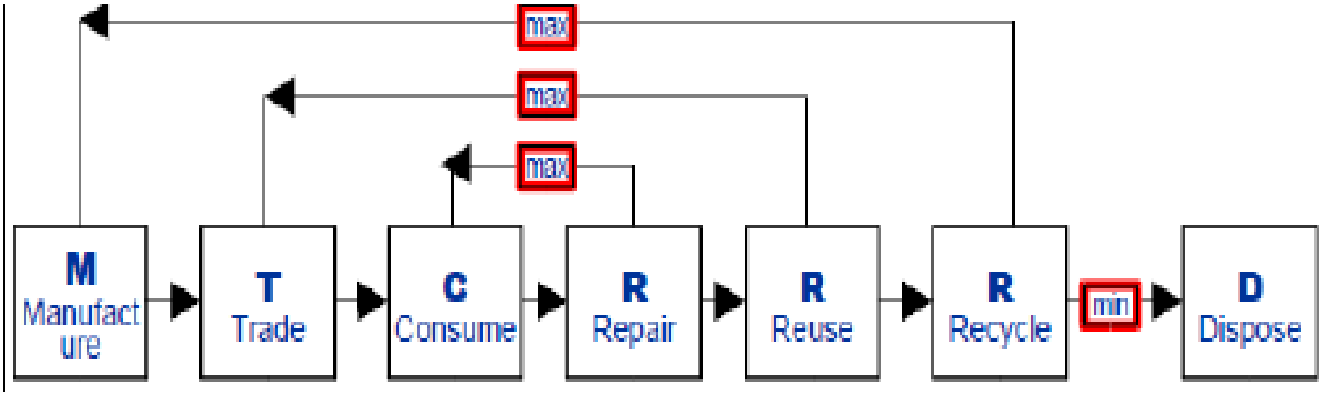
8.1 Optimizing E-WASTE Flows for an E-WASTE Management System

The diagram in figure 5 below indicates the optimal life-cycle of a product from the point of manufacture through to maximum recycling of material back into new product and minimised disposal of un-recyclable material. Once the product has been used by the consumer it should be repaired and re-used to extend the product life before being recycled and used in the manufacture of new product. The ERA E-WASTE IndWMP is built on securing that this optimal E-WASTE flow is achieved. It proposes that special emphasis is placed on promoting higher value retention options that acknowledge the superior approach when "functions" rather than "materials" are recovered.

8.1.1 Repair and Reuse Optimisation

It is crucial that the IndWMP delivers on programmes that maximise repair and reuse opportunities and enable consumers to hold on to their EEE products for longer. To this end ERA will promote "Repair Cafes"[65] where householders can bring broken EEE to a technician and get shown how to fix repairable items and optimally retain them (for prolonged re-use). However, some practical and safety concerns that have been expressed with regard to the optimisation (prolonged use) of EEE. There is considerable danger and many incidents have been reported where large household appliances ("White Goods")[66] have started fires caused by faulty wiring. Thus ANY repair to WEEE needs to be undertaken by appropriately qualified technicians or supervised by such qualified technicians.

Figure 5



8.1.2 More and Better Recyclate That Can Be Locally Processed, Recycled and Treated

Maximizing collection and the consolidation of specific E-WASTE categories can help to secure much needed private sector recycling technology investments by achieving the required "economics of scale". Recycling technology investment is currently needed for E-WASTE categories and fractions such as the recovery of HIPS, PC and ABS plastics, chargeable and non-rechargeable batteries (excluding lead acid type car batteries), lead bearing CRT screens, controlled CFC gas extraction from cooling appliances and the recycling of ink and powder pigment from printer cartridges and toners.

[65] https://repaircafe.org/
[66] https://www.mirror.co.uk/news/uk-news/white-goods-time-bomb-warning-7551455

8.1.3 Safe and Optimised Transboundary Movement of E-WASTE to and from South Africa

The draft ITA/EWASA IndWMP sought to ensure that government does not from the outset limit growth for the recycling sector through restrictive/prohibitive laws for E-WASTE treatment and transportation or through Pricing Preference Systems that artificially try to retain materials that can fetch better export prices.

There are currently E-WASTE fractions with high precious metal content such as mother boards and mobile phones which are the key resource for high-tech smelting facilities that are only available in a few countries like Canada, Sweden and Belgium, among others. These fractions will require export to such facilities to benefit from best material and value recovery. Smelters in developed economies such as Germany, Belgium and the Netherlands are currently accepting the importation of E-WASTE in a controlled manner through so called "pre-consignment" agreements with certain clients that can prove their legal compliance with exporter government's regulations.

The positioning of South Africa as a safe "pre-processing treatment hub" can further improve E-WASTE volumes required to financially sustain local recycling solutions. By applying strict controls through country agreements and waste life cycle assessments (as per the Basel Convention to which South Africa is a signatory), South Africa's economy could benefit from providing the African continent with a regional E-WASTE solution for specific E-WASTE categories and fractions.

According to some of the latest global E-WASTE studies[67] manual dismantling delivers the highest quality secondary raw material yield. In promoting manual dismantling, more job opportunities for the local economy can be generated. It is claimed that about 25 jobs per ton of recycled E-WASTE is created.[68]

These are matters that must obviously be resolved by government. In the opinion of the ERA Steercom, the free flow of E-WASTE fractions and materials in and out of South Africa will be critical to the question of how sustainable local E-WASTE processing can be. The Gauteng Provincial Government is lobbying the DEA to restrict the import and export of E-WASTE to avoid the danger of becoming an E-WASTE "dumping ground". This matter needs to be addressed and put into perspective by the ERA NPC in due course. If this issue is not adequately resolved there is a high likelihood that the E-WASTE IndWMP's opportunities for entrepreneurs to provide technical nutrients that can unlock new local markets could be hampered.

8.1.4 Other Required Governmental Optimisation Intervention

Market development for recycled E-WASTE[69]

The Department of Trade and Industry (DTI) is credited for acknowledging waste and waste management as a dynamic and fast changing sector. As such, waste is part of its Market Development Programme which entails support measures that would promote the recycling industry at large through the creation of new markets and the strengthening of the existing ones to provide more employment opportunities. One of the notable barriers to an improved and sustainable recycling industry is the lack of stable and economically attractive markets for recyclable materials.

A Government supported market development programme must develop manufacturing capacity to produce recycled products and provide value-add markets for recycled goods.[70]. Pages 60 and 61 of

[67](SRI Roundtable International Workshop, 2017)
(Godfrey L., Strydom W. and Phukubye R., 2016)
(Lydall M., Wonder N. , Yulandi J., 2017)
[68](Lydall M., Wonder N. , Yulandi J., 2017)
[69](ATE, 2012) Pages 59-60

the ATE Report outline in much detail what DTI needs to do to stimulate the E-WASTE recycling economy and what it needs to understand about E-WASTE in order to do so effectively.

Best practice controls for hazardous substances used in EEE

It is generally accepted that E-WASTE can contain hazardous substances and the composition of these substances can vary significantly between products and product types. Some items can contain trace levels of these substances and others contain more significant amounts of them. Given the complexities in regulating the use of substances in products, it is suggested that government aligns the country's import and manufacturing restrictions with best practice RoHS type legislation. Imports of product that do not comply would be prevented from entering the South African market. Compliance with this requirement would be in conformance with international standard IEC 63000. Steercom producer members support this approach given its use of standardisation that would not inhibit the entrance of compliant products into the market.

Reduce the risk of 'free riders' that would abuse the E-WASTE management system

There are an estimated 5,500 EEE producers in South Africa and there is concern that some of these will not subscribe to the E-WASTE IndWMP by registering as EEE producers, registering EEE products and pay the E-WASTE management levy as proposed by this Plan. These are called 'free-riders', and those producers that are subscribed will be paying for the treatment of E-WASTE deriving from the products which the 'free-riders' placed on market.

'Free-riding' should be a criminal offence in much the same way that all undeclared trade in new or second-hand EEE will be illegal when the E-WASTE IndWMP is promulgated into law.

However, it does seem the most dominant producers for all categories of EEE product on the South African market are known and therefore 'free riders' should not amount to more than 5% of the entire producer population. The future ERA NPC, as an E-WASTE PRO will need to address these matters systematically and effectively and with strong enforcement assistance from the DEA Waste Bureau.

[70](ATE, 2012) Page 60

9. The ERA E-WASTE Product Responsibility Organisation (PRO) - Objectives and Structure

9.1 Name and Type of Organization

ERA is a non-profit company (NPC) formed in terms of the Companies Act, No. 71 of 2008 to administer the E-WASTE IndWMP. ERA is the shortened name for E-Waste Recycling Authority. Its function is that of a Product Responsibility Organisation.[71] The ERA Memorandum of Incorporation enclosed is attached as Annexure 2.

9.2 Composition of the ERA Board of Directors

1. The choice of "Product Responsibility" is a departure from the global EPR concept of "Producer Responsibility" and is made deliberately to reflect the inclusion of a wide range of stakeholders in the E-WASTE management system. Among the key stakeholders are the following:
    a) Producers (including EEE OEMs, importers, local manufacturers
    b) EEE Retailers and distributors
    c) E-WASTE collectors
    d) E-WASTE refurbishers, dismantlers and recyclers
    e) E-WASTE processors
    f) E-WASTE consumers
    g) E-WASTE disposal facilities
    h) The SA government

2. The initial office bearers of ERA will serve for an initial period of 2 years, and thereafter it will revert to an annual election of office bearers as provided for in the ERA MoI Appendix 2.
3. The initial office bearers of ERA were appointed by the founding members of ERA.
4. The founding members of ERA are the members that served on the e-Waste IndWMP Steering Committee.
5. All office bearers, save for the CEO of ERA who is appointed on a fixed term contract, will be eligible for re-election at each and every elective AGM held by ERA. There will be no permanent office bearers by virtue of them being founder members of ERA.
6. The board members of ERA will comprise ten office bearers of which one will be the ex-officio Managing Director. The remaining 9 office bearer positions will be made up of two nominees from the following sectors:
    - Producers' Associations (importers, OEMs and manufacturers)
    - Recyclers' Associations
    - Retailers' Associations
    - The remaining 3 office bearers will be nominated from among community enterprise interests, as well as expertise from the legal, financial or academic fields.

[71] SEE Addendum 2 to IndWMP for ERA Memorandum of Incorporation

9.3 The Nature of ERA as a Non-Profit Company

The choice of a Non-Profit Company as the institutional vehicle to oversee the implementation and further development of the E-WASTE IndWMP is deemed to be the most appropriate organizational format as the E-WASTE IndWMP is a public interest Plan dealing with the problems of the "commons"/public. An NPC's shareholders are technically public interest groups and thus this format accommodates the multi-stakeholder nature and cooperative governance framework of the Plan. Within and of itself, a Non-profit Company carries numerous safeguards against abuse and corruption. Key among these is that the assets of the company will always serve the goals of a similar organization (in the event of liquidation) and that the directors of the company may not share in the profits of the company. Directors of the company may also only be fairly remunerated for the services which they render to the company. At no stage may a director be involved in a determination or award wherefrom s/he stands to gain personally and financially. Clear safeguards against conflicts of interest and corrupt behaviour will be developed by the board of ERA.

Of particular concern is that the office-bearers and staff of the ERA need to ensure that no sensitive and anti-competitive trade data is disclosed, wittingly or unwittingly, to any party, where such disclosure can prejudice or be can be reasonably anticipated to prejudice that party in the market-place, or in the eyes of the public, except, insofar as such disclosure of such information may be in the public interest and it arises from the party being found guilty in a court of law of being wilfully or negligently evading their obligations as a subscriber to the IndWMP. Further measures for safeguarding against and dealing with breaches of confidentiality among the board and staff of ERA will be developed in due course.

9.4 ERA Goals and Objectives

ERA is established as the South African E-WASTE Product Responsibility Organisation to regulate and develop a progressive E-WASTE industry in South Africa with the objective of ensuring that South Africa has an effective and sustainable E-WASTE management system and Plan. The ERA objectives are principally the following:

1. ERA will define the obligations and expectations of all stakeholders involved in the effective and efficient management of E-WASTE in accordance with the *'reduce, reuse, recycle and safe disposal*" principles advanced by government and endorsed as a cornerstone of this E-WASTE IndWMP. These obligations and expectations are set out in Chapter 4 of this Plan.
2. ERA will conduct a detailed recycling cost and value assessment in order to better understand and accurately determine recycling subsidies that will ultimately enable industry growth, job creation and improved E-WASTE recycling rates.
3. ERA seeks to support, in practical ways, the effective implementation of the E-WASTE IndWMP by setting up the appropriate governance and management structures for the key strategies that comprise the IndWMP.
4. ERA's guiding approach of cradle to cradle management for the E-WASTE IndWMP follows the waste management hierarchy as contemplated in Chapter 8. Such management must pose no harm to our health and environment and it must pursue global best practice in the treatment (recycling) of E-WASTE with due regard to our particular conditions. It must also contribute positively to our social and economic objectives.
5. ERA seeks to develop local E-WASTE treatment (processing) capacity. This means assisting those processors recovering manufacturing raw material from E-WASTE and those applying processes to create new product from recycled E-WASTE. The form of assistance is manifold:
    a) Assist in developing markets, especially for products using material from recycled E-WASTE;

b) Support research and development into appropriate recycling technologies;
c) Provide finance or part-finance for the implementation of appropriate technologies for processing E-WASTE; and
d) Assist in streaming adequate E-WASTE stock to registered E-WASTE processors and recyclers

6. ERA will continuously work to developing an effective E-WASTE management system. This includes the registration of all role-players, the provision of adequate infrastructure and logistical support for all involved in the E-WASTE management process. This includes but is not limited to:

    a) Supporting E-WASTE businesses by firstly recognising them as E-WASTE businesses, and with that, create a supply chain of E-WASTE businesses – from grassroots operations to large-scale recyclers
    b) In addition to financial support (where necessary), support E-WASTE recycling enterprises through the provision of technical and enterprise training and support, as well as ensure the stability of E-WASTE supply for recycling and processing and the stimulation of markets for such recycled and recovered products.
    c) Support government's environmental, economic and social objectives and to implement the DEA waste management mandate, specifically as it relates to…

    - Promotion of the waste hierarchy of Reduce, Re-use, Recycle and Responsible disposal
    - Maximum landfill diversion of E-WASTE
    - Use of toxic landfill facilities for disposal of E-WASTE (if disposal is necessary)
    - Fulfilling the conditions of the Basel Convention which allows the trans-boundary movement of hazardous waste under controlled conditions
    - Maximum local beneficiation of E-WASTE in order to stimulate enterprise and job creation
    - All other waste management legislation and regulation
    - Maximised legal recovery of value fractions and elements contained in E-WASTE

7. ERA will seek to develop a comprehensive and accurate understanding of the volume of EEE product imported and locally manufactured, new and second-hand, that is placed on the South African market. This includes data on the elements contained in those EEE products, their average weights as well as their average life-spans with a view to...

    - Understanding the amount of E-WASTE imported or generated inside the country;
    - Understanding what environmental and health and safety implications the recycling and disposal of this E-WASTE contains;

8. ERA will make the necessary provisions for the maximum beneficiation of E-WASTE and the minimal environmental, health and safety impact arising from the processing and recycling of E-WASTE.

9. ERA will support the application of the EU ROHS (or similar obligations as developed from time to time) and will seek to ensure that EEE producers (local and international) adhere to their obligations with regard to the materials and substances used in their manufacture process;

10. ERA will ensure that all importers and local manufacturers of EEE contribute towards the cost of sound E-WASTE management in South Africa.

11. ERA will develop a comprehensive and accurate understanding of all the role-players in the E-WASTE recycling challenge and will define how they should / can contribute towards the challenges and opportunities presented by the responsible management of the country's E-WASTE. To this end it will define and refine the roles, obligations and expectations for each

stakeholder or set of stakeholders. Alongside this objective, it will also develop a set of incentives and disincentives for all stakeholders.

12. ERA will facilitate and develop the infrastructure and other enabling parameters to achieve the desired outcomes of sound E-WASTE management in the country. Specifically, this involves plotting a course of action for tracking and guiding the following elements of the E-WASTE management system:
    - Collection infrastructure and household and corporate E-WASTE disposal practices;
    - Promotion of refurbishment and reuse practices and standards;
    - Promotion of complete control and accountability for the treatment (recycling) of E-WASTE.
13. ERA will develop the necessary information and data tracking systems that needs to anchor the above stated objectives. This must be done with due regard to the following:
    - EEE producers' requirements for confidentiality regarding their market share;
    - E-WASTE recyclers requirements for confidentiality regarding their market share;
    - The imperative of not promoting uncompetitive practices among either set of stakeholders;
    - Ensuring that the 'confidentiality' imperatives do not create conditions of non-accountability or obfuscation.
14. ERA will ensure that an E-WASTE management system is implemented with adequate participation of all stakeholders. It will ensure that it is open to representation from all stakeholders with regards to the management of E-WASTE and to make representation to all stakeholders based on information that comes to light in the course of implementing the IndWMP, or that arises from the representations made by its various stakeholders.
15. ERA will develop an adequate budget and resource Plan with a view to setting an equitable and appropriate E-WASTE management levy to be paid by EEE producers. The budgets will be sourced from Producers via the Waste Management Bureau.
16. ERA will ensure that education and awareness programmes are designed and/or supported that inform all consumers of EEE of their responsibilities in managing E-WASTE properly and all the issues related thereto. It will develop the key messages for educating consumers and ensure that there is uniform branding and signage for registered stakeholder collection points for easy identification by consumers.
17. ERA will ensure that regular and relevant reports are provided to stakeholders and the DEA with regards to the total amount of waste collected and treated by category, quarterly reporting of output by material state (re-use, recycle), type (product, metal, plastic, other) and destination (smelter, incinerator, manufacturer, landfill).
18. ERA will set collection, transport, end-use recycling/processing and recycling (pre-processing) standards for E-WASTE services in line with global standards, in accordance with the proposed Tier 1-4 Recycler system and using current law as a baseline. It will also track and monitor the compliance of all stakeholders with regards to their obligations as spelt out in Chapter 4. If necessary, it will ensure that corrective action is taken by stakeholders in breach of their conditions of registration / accreditation.
19. ERA will establish a 5-year IndWMP with programmes to promote sustainable enterprise development with regard to:
    a) E-WASTE industry growth
    b) E-WASTE recycling technology and Plant development
    c) Setting incremental targets towards maximising compliant E-WASTE collection and recycling
    d) Promotion of the waste hierarchy

9.5 ERA Structure and Functions

The ERA management will not be contracted out to any third party and will function directly under the governance of and be accountable to the ERA Board. It will develop its own core competencies as required for the successful implementation of the E-WASTE IndWMP.

The ERA board will appoint a CEO to implement the E-WASTE IndWMP. The CEO, with support and defined involvement from the board, will in turn make the following appoints:

a. The ERA staff across the following key functions of the organisation:

- Operations management staff that will be accountable for the implementation of all the elements of the ERA E-WASTE management programme, as presented in Chapter 10. These include, inter alia:
  - ERA information systems for tracking the registration and accreditation of all relevant stakeholders in the E-WASTE management system as defined in Chapter 4.
  - Monitoring compliance of all registered stakeholders in the E-WASTE management system.
  - Marketing and information dissemination to all stakeholders, inclusive of EEE consumers.
  - Assessment, support and adjudication of all applications from E-WASTE collectors, recyclers and processors for registration and accreditation in their respective categories of E-WASTE management.
  - The logistical support for the operations and infrastructure of the E-WASTE collection, recycling, processing and disposal network that comprises the E-WASTE management system.
  - Core HR and administration functions, including office management services.
- Financial management staff for managing the organisation's internal and stakeholder related financial responsibilities, inclusive of ensuring that internal, external and stakeholder audits are conducted on a regular basis.

b. A specialized and appropriate data management and administration service provider who will hold and process all "classified data categories" in strictest security, ideally in the form of an independent regulated industry organisation that functions in a high security environment to function as a 'Black Box' where all sensitive data operations are managed in isolation from other ERA functions. It will, among other things, be responsible for recording the following sensitive data which will not be shared with anybody, except in aggregate form with the ERA board and management: It will…

  - Track, record and report all EEE product placed on the South African market by category and weight
  - Ensure that it provides ERA only with data aggregates required and requested for measuring E-WASTE collected and processed by all registered E-WASTE Recyclers by category.
  - Track, record and report the E-WASTE management levies due and paid by producers in relation to the product that they placed on the South African market
  - Manage any other functions deemed to be too sensitive to deal with inside ERA and which could lead to compromising and prejudicing producers and/or recyclers, especially as it relates to their market share

c. Appoint a firm or firms of auditors to undertake an assessment of ERA's accounts, operations and processes, as well as that of stakeholders that have been registered / accredited by ERA and who are being supported by ERA. In particular, the auditors will assess and verify the extent to which registered stakeholders have complied with ERA requirements.

   ERA has a significant monitoring and evaluation function built into the Plan. This function is needed to verify and audit the subscribed recyclers' compliance with the terms and conditions of their registration with ERA, as well as verify the weight and type of E-WASTE processed by recyclers. This function needs to be managed in-house as there are numerous recycling subsidy transactions anticipated and this will require extreme vigilance.

   However, the work of the monitoring and evaluation function must be of a sufficiently high standard so as to assist ERA's auditors in all of their functions as described below.

   The auditors will undertake the following audits:

   - Achievement of targets and KPIs as set by ERA. This includes the following:
     - Enterprise development programmes
     - Education and awareness programmes
     - Recycler evaluation, approval, auditing, contracting, and monitoring
   - ERA financial statements / reports for submission to the DEA and all stakeholders
   - Details of E-WASTE collection points and recyclers involved
   - Details of E-WASTE collected and treated by category and weight received and by category and weight treated, including the source and destination of E-WASTE treated.
   - Landfill diversion rates

d. It is recorded that the MoI makes provision for the establishment of board sub-committees – Section 25 of the MoI and as contemplated in Sections 72(1) and 72(2)(a) of the Companies Act refers. These sub-committees can comprise non-board members who have the requisite skills and experience to assist ERA in executing its functions. It is envisaged that the following sub-committees will be created:

   - Audit and risk committee
   - Stakeholder registration/accreditation and contract awards committee. This committee will also have oversight over all tenders in the amount of R500,000 or more awarded from ERA funds (and as provided for in the E-WASTE IndWMP)
   - Stakeholder standards setting committee
   - Technology and research and development committee

9.6 KPIs of the ERA IndWMP

The setting of KPIs is important for measuring the success of the IndWMP. Among the ERA KPIs are the following:

- Number of producers registered
- Number of producers reporting product placed on market
- Number of producers paying their E-WASTE management levy as specified in chapter 6
- Number of E-WASTE collectors, transporters, recyclers and processors registered and accredited by ERA
- Number and location of official collection points and recyclers working with E-WASTE
- Amount of waste collected and treated by category

- Consistency and regulatory of all reports to DEA and stakeholders
- Efficiency of the data and information management system for tracking all relevant data
- Efficiency of disbursements, especially to various stakeholders in the E-WASTE collection and treatment process
- Jobs and enterprises created, with due consideration of BBBEEE requirements

9.7 Corporate Social Investment

The corporate social investment approach of the E-WASTE IndWMP Plan is to build a sustainable E-WASTE management system that promotes E-WASTE enterprises in the storage, transportation, recycling and auditing functions of the E-WASTE management system that creates jobs within the sector. The Plan aims to stimulate over 10,500 jobs within the next five years of the Plan as is described in detail in Chapter 10.

The previously disadvantaged, as defined by government policy, will be co-opted into the E-WASTE management system as discussed in Chapter 4.6 and Appendices 9 and 15 of this Plan.

Our Corporate Social Investment goal is to facilitate the following:

- Sustained job creation
- Sustained capacity-building for small-scale entrepreneurs to improve their compliance and competitiveness.
- Collaboration between the producers, collectors, transporters, processors and recyclers in terms of creating linking opportunities for these entities.
- Increasing the number of small-scale businesses in this sector
- The provision of mentors and industry experts to the sector

The progress of the ERA social responsibility Plan will be continually tracked to measure and determine the effectiveness of the IndWMP and the sustainability indices will include:

1) The number of jobs created
2) The number of SME's created / supported
3) The extent of the transfer of technical skills to the sector

10. ERA E-WASTE IndWMP Targets, Programmes and Budgets

The E-WASTE IndWMP targets the following E-WASTE management factors:

- The establishment and implementation of a national unified E-WASTE management system through the promulgation of a national Plan called the E-WASTE IndWMP.
- The establishment of a national E-WASTE management authority to implement the E-WASTE IndWMP and to regulate all stakeholders involved in E-WASTE generation, recycling and disposal.
- The definition of all key stakeholders, the roles that they are expected to play, as well as the registration and accreditation of all stakeholders who wish to participate in the E-WASTE management system.
- Clarify the challenges and opportunities presented by E-WASTE, and the desired outcomes and approaches to be adopted in managing these challenges and opportunities.
- Setting targets for E-WASTE collection, recycling, processing and disposal.
- The setting of a waste management charge which is initially to be levied equally on all imported and locally manufactured EEE placed on the South Africa market, whether new or 2nd hand. This levy is based on a standard rate per kilogram of EEE. The specific list of EEE goods to which the levy will be applied is listed in Appendix 1.
- The establishment of programmes and activity aimed at addressing the challenges and opportunities presented by E-WASTE and, through the ERA NPC, ensure the equitable and sustainable application of resources accruing from the E-WASTE management levy to support these programmes and activities.
- Be accountable to all contributing stakeholders, government and the public for the disbursement of the E-WASTE management levy and the results achieved through the adoption and implementation of the E-WASTE IndWMP.
- The E-WASTE IndWMP has the headline targets / results reflected in Appendix 11 and projected over a period of 5 years regarding E-WASTE generation, collection and recycling rates as well as the number and type of new enterprises that will be supported and their envisaged new contribution of the latter regarding increased collection and recycling rates.

10.1 WEEE Collection and Recycling Targets

The current working assumption is that 425,000 tons of EEE comes onto the South African market annually and that 360,000 tons of EEE becomes E-WASTE annually. Of the 360,000 tons of E-WASTE, it is estimated that approximately 25,000 tons (7%) of E-WASTE is being collected and treated in a manner that is reasonably consistent with the standards set in the E-WASTE IndWMP. The scrap metal industry is excluded from this estimate as scrap metal is not classified as waste, it is not required to report into the DEA's SAWIS database and there are no special provisions for the collection and handling of scrap metal. It is assessed that the networks of recyclers that collect and treat the 25,000 tons of E-WASTE are as follows:

*Table 3: **Current E-WASTE Collection and Recycling** (excluding E-WASTE handled by Scrap Dealer or Informal Collectors)*

Tier	Estimated No. Recyclers	Estimated tons of E-WASTE collected and recycled p.a. - each	Indicative growth in number of E-WASTE recyclers over 5 years	Total estimated tons of E-WASTE collected and recycled p.a. (CURRENT)
Tier 1	7	2 500	15	17 500
Tier 2	25	80	50	2 000
Tier 3	600	6	600	3 600
		n/a	Plus 1600	n/a
Tier 4	60,000 to90,000 of which 10,000 collect E-WASTE and 2,000 regularly collect E-WASTE	Collection volumes ~ 2000 tons (from core business E-WASTE collectors)	2 000	n/a
TOTAL tons				**25 100**

ERA has set an incremental FORMALIZED E-WASTE collection and recycling growth target of 30% per annum off the current base of 25,000 tons. This translates into the following targets over a 5-year period:

Table 4: Growth Projection for the increase of FORMALIZED Collection and Recycling of E-WASTE

Year	Total tons of E-WASTE collected and recycled p.a.	Total additional tons of E-WASTE collected and recycled p.a. Year on Year
Current	25 000	n/a
1	33 000.00	8 000
2	43 000.00	10 000
3	55 000.00	12 000
4	72 000.00	17 000
5	93 000.00	21 000

Note that the above target excludes the scrap metal industry and applies only to the registered and compliant E-WASTE collection and recycling industry.

With the 30% year on year increment in E-WASTE collection and recycling, about 93,000 tons of E-WASTE will be collected and recycled by ERA registered service providers by the 5th year which will amount to 26% the estimated E-WASTE coming onto the market. –i.e. when measured against the current baseline of 360,000 tons p.a. of E-WASTE generation. It is reasonably anticipated, however, that the amount of E-WASTE generated annually will also continue to increase year on year, but until such time as more reliable data is acquired, this growth will not be factored into the equation.

The E-WASTE recycling target has been set modestly because a considerable amount of data relevant to EEE imports, E-WASTE generation and E-WASTE collection and recycling practices is still required. A key objective of the IndWMP is to ensure that the systemic strategies and targets introduced in this IndWMP will lead to a sustainable E-WASTE recycling system and industry. Setting overly ambitious E-WASTE recycling targets will undermine such an objective.

However, as more reliable data emerges during the course of implementation of the IndWMP, the ERA board and management will revisit the targets and all other relevant elements of the Plan to accommodate the new facts and perspectives. In addition to the data challenges, ERA has to set in place a very significant number of innovations, systems and standards which will require highly competent governance and management. This also requires effort and time to develop.

10.2 E-WASTE Collection and Recycling Enterprise Targets

In order to achieve the E-WASTE collection and recycling targets set above, the existing network of E-WASTE collectors and recyclers involved with pre-processing needs to grow meaningfully and equitably.

There are a limited number of Tier 1, 2 and 3 E-WASTE collection, recycling and end-use processing enterprises operating in South Africa. The Plan puts in place mechanisms and incentives to drive up the amount of E-WASTE collected and treated by the existing stakeholders who are engaged in pre-processing activities. However it is believed by Steercom and also confirmed through Informal Sector research on job creation potential done by the CSIR and Mintek[72] that there is also considerable scope for the expansion of the E-WASTE management network to include new enterprises and improve on the current job creation potential in the formal E-WASTE sector of 25 jobs/1000 tons of E-WASTE[73]. In fact, all evidence shows that the existing footprint for E-WASTE collection and treatment, on its own, cannot achieve the modest collection and treatment targets set by this Plan. Placing reliance only on the existing network will create undesirable monopoly conditions for E-WASTE collection, recycling and processing and will undermine the development of a vibrant, broad-based and sustainable E-WASTE management industry.

Informal waste collectors and recyclers are an inescapable part of the South African reality, and as such, ERA has found a meaningful way of incorporating this network into meeting the IndWMP collection and recycling targets. To this end they have been formally incorporated into the Plan as a Tier 4 E-WASTE enterprise. The following table will help to demonstrate why there is a need to expand the number of enterprises involved in E-WASTE collection, recycling and processing, and how this will be done:

[72](Godfrey L., Strydom W. and Phukubye R., 2016)
(Lydall M., Wonder N. , Yulandi J., 2017)
[73](Lydall M., Wonder N. , Yulandi J., 2017) Page 65

Table 5: ***Demonstration of enterprise development targets to support targets set for E-WASTE collection and recycling***

	2018 CURRENT NO. ENTERPRISES & CURRENT COLLECTION & RECYCLING RATES			2023 CURRENT NO. ENTERPRISES & INCREASED COLLECTION & RECYCLING		2023 INCREASED NO. of ENTERPRISES & INCREASED COLLECTION AND RECYCLING	
Tier	**No. of E-WASTE Enterprises**	**Average tons of E-WASTE collected and recycled p.a. EACH**	**Average tons of E-WASTE collected and recycled p.a. TOTAL**	**Growth in average tons of E-WASTE collected and recycled p.a. EACH**	**Growth in average tons of E-WASTE collected & recycled p.a. TOTAL**	**No. of E-WASTE Enterprises TOTAL**	**Total tons of E-WASTE collected & recycled p.a. TOTAL**
Tier 1	**7**	2 500	17 500	5 000	35 000	**15 (x2)**	75 000 (x4)
Tier 2	**25**	80	2 000	200	5 000	**50 (x2)**	10 000 (x5)
Tier 3	**600**	6	3 600	20	12 000	**2 200 (x3.5)**	44 000 (x12)
Tier 4	**10 000**	200 kgs	2000	n/a	2 000	**2 000 (x2000)**	Feed into E-WASTE volumes of Tiers 1, 2 & 3
TOTAL TARGET			**25 100**		**54 000**		**129 000 *****

Note: The figures provided in brackets indicate growth in number of enterprises and growth E-WASTE collected and recycled.
*** **Adjusted target of 93,000 tons** collected and recycled by 5th year of Plan. Adjusted as not all Tier 1 enterprises (15) will achieve an average of 5,000 tons per annum; not all Tier 2 enterprises (50) will achieve an average of 200 tons per annum; and not all Tier 3 enterprises will achieve an average of 20 tons per annum. 93,000 tons of E-WASTE collection and recycling will account for 26% of the estimated 360,000 tons of E-WASTE currently generated p.a.

Table 6: Description of Tiers and Factors Driving their Growth

Tier 1 Description	○ Large scale dismantling (including mechanical separation) of all E-WASTE, baling and distribution to final disposal and/or processing destinations. ○ Refurbishment of EEE assets ○ Fully Licensed, Legal and Compliant ○ Average volume of E-WASTE recycled is **2,500 tons** p.a.
Tier 2 Description	○ Average volume of E-WASTE recycled is **80 tons** p.a.

Factors driving growth for Tiers 1 & 2

- Recycling subsidies
- Stock volumes due to extended E-WASTE collection, drop-off and buy-back network
- Subsidised transport
- Development of markets for recycled/ refurbished goods
- Technology and Research and Development support

Tier 3 Description	○ e--Waste buy-back centres and drop-off sites ○ Refurbishment of EEE assets ○ Limited dismantling and sorting of E-WASTE for distribution to Tier 1 and Tier 2 (as appropriate and approved) ○ Formal structure, and fully compliant with ERA standards ○ Legal and Compliant ○ Average size from 6 - tons of E-WASTE collected / processed p.a.

Factors driving growth for Tier 3

- Recycling subsidies
- Transport subsidies to get E-WASTE to Tier 1 and 2 E-WASTE recyclers
- Training and PPE
- Tier 4 E-WASTE feeder system
- Part operations and part infrastructure support
- Technology and Research and Development support

Tier 4 Description	○ FORMALISED grassroots E-WASTE collectors ○ Operate to a Code of Good Conduct ○ Household, street and landfill E-WASTE collection

Factors driving growth for Tier 4

- Recycling subsidies
- Training and PPE
- IndWMP marketing, education and awareness, plus branding
- Accessible buy-back centres

E-WASTE Processors	○ Smelters and recovering of materials required in manufacture ○ New product from E-WASTE fractions and recovered materials

Factors driving growth for Processors

- Increased supply of compliantly recycled / sorted E-WASTE through co-ordinated streaming of E-WASTE stocks
- Technology and Research and Development support

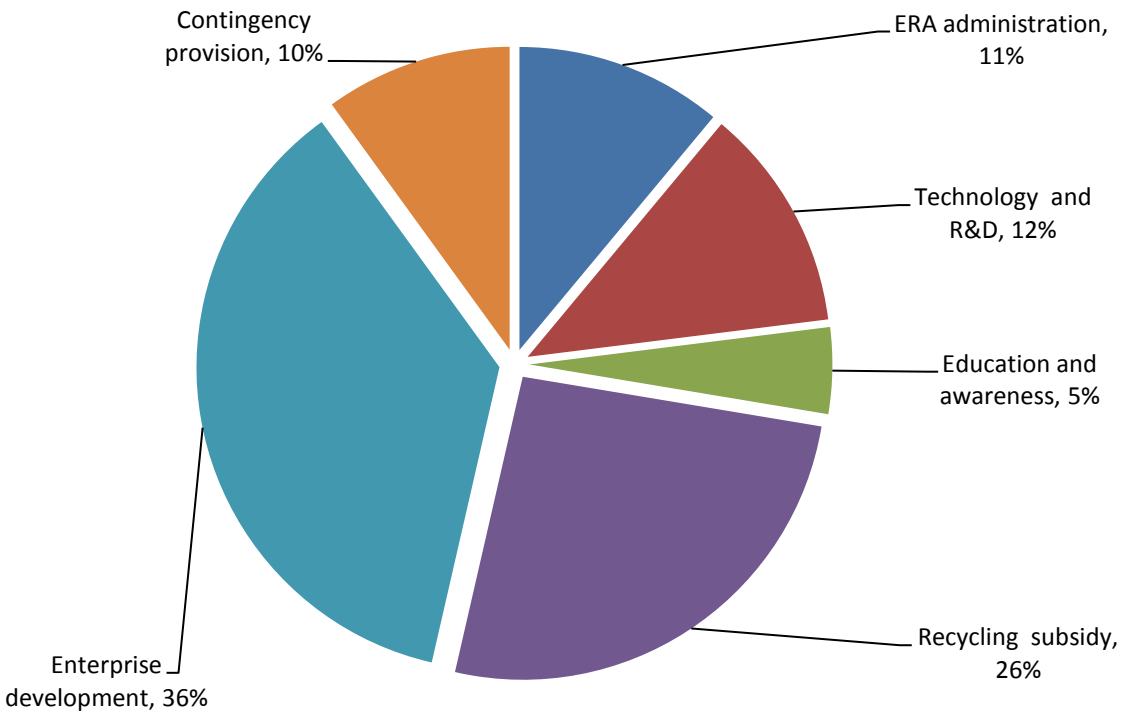
10.3 ERA Budget Allocations

The overall budget required to implement the E-WASTE IndWMP is as follows:

Table 7: Budget Allocation Table

Budget Allocation Category	% of Budget	Amounts (ZAR)
ERA administration and operations	11%	60 000 000
Technology investments and research & development	12%	65 000 000
Education and awareness	5%	25 000 000
Recycling (E-WASTE handling) subsidy	26%	145 200 000
Enterprise development	36%	197 759 980
Sub-total Budget		**492 959 980**
Contingency Provision	10%	**49 295998**
TOTAL BUDGET		**542 255 978**

Figure 6 ERA First Year Budget Breakdown



10.3.1 ERA Administration and Operations

ERA administration and operations	**11%**	**R 60 000 000**

Chapter 9 of the IndWMP explains the ERA structures and functions. The budget presented in the IndWMP poses a challenge for the effective functioning of ERA, but as with most non-profit companies, it will have to optimise its budget. As is good practice for non-profit companies, the operations and administration budget should not exceed 15% of total budget. It is for this reason, and due to the uncertain base-line data that a contingency of 10% was deemed necessary, at least for the start-up phase of ERA. It may well be that other elements of the ERA programme will also be more demanding than anticipated.

The list below is merely illustrative and provides an orientation around the key elements of the ERA administration and operations budget.

- An information system is required to hold a significant and varied amount of data from all stakeholders. It must ideally articulate with the SAWIS database and also link dynamically to E-WASTE collection and recycling verification and payment systems.
- The management, accounts, IT, HR and administration systems require particular attention and talent.
- There is a huge demand for verification, monitoring and auditing in the E-WASTE management system,
- There is a very significant demand for effective business assessment, support and training in the start-up phases of the IndWMP – especially in its first five years of operation.
- Over and above the business development elements of the Plan, stakeholders registering with ERA will need facilitation of their required environmental licenses and permits.
- The system has a very significant requirement for effective contracts and contract management.
- ERA will have significant set-up requirements which will involve a more than routine capital layout for buildings, equipment and core infrastructure.
- As ERA is establishing itself and a new co-ordinated system for E-WASTE management (the IndWMP), there will be very significant marketing, branding, communication and awareness requirements that need to be addressed.
- ERA will need to contract very specialised service providers like auditors and third party that manages confidential producer data and takes over the Black Box function,
- ERA will be managing numerous committees and service providers to assist in enterprise adjudication processes, in the education and awareness and training campaigns, in implementing the research and development agenda and the technology investment adjudication.

10.3.2 ERA Technology Investments and Research and Development

Technology investments &research and development • R15m for Research and Development • R50m for Technology and Plant Investments	**12%**	**R 65 000 000**

As discussed in Section 8.1.3 there is huge concern regarding the Department of Environmental Affairs plan to restrict and even stop the transboundary movement of E-WASTE. In part, this relates to the importation of E-WASTE (in the form of donations of EEE assets which deliberately or unintentionally escalates the generation E-WASTE on South African soil) or in the form of second-hand goods imports. The latter is less of a burden given that it will contribute equally to the E-WASTE management levy.

As it has been highlighted, due to the current lack of end-recyclers/processors located in South Africa the country on its own does not have the capacity to deal with many types of E-WASTE, either to recover its high-end value materials or to treat problematic fractions.

On the other hand, it is increasingly evident that *"regional cross-border shipments of WEEE can further improve WEEE volumes required for local sustainable recycling solutions. … South Africa's economy could benefit greatly from providing the African continent with regional WEEE solutions for specific WEEE categories and fractions"*[74] and offer considerable value adding services regarding repair, refurbishment and any pre-processing of E-WASTE required[75] including optimised collection systems with all the related job creation and enterprise development opportunities attached.

Steercom is also of the view that E-WASTE needs to be able to travel freely and cross borders inside and outside of South Africa in order that it may be traded at better prices than what is offered in the country and in order that it may be processed and treated to the best global standards available whilst the capacity and technology to treat locally is developed.

ERA plans to spend the better part of its first five years to assess this nexus between the need to treat E-WASTE properly while strengthening South Africa's local recycling economy and to make strategic decisions about what is best, environmentally, economically and socially.

To this end it will support studies and commission, where necessary, research into Best Environmental Practices (BEP) and Best Available Treatment (BAT) with regard to the recycling and treatment of E-WASTE. While this research is being is undertaken and supported, ERA recognises that it needs to maximise the collection and consolidation of specific E-WASTE categories (stock) in order to secure much needed technology investments. Recycling technology investment is currently needed for E-WASTE categories and fractions such as ABS plastics, chargeable and non-rechargeable batteries (excluding lead acid type), CRT tubes, CFC extraction and treatment of refrigerators and printer cartridges. It is critical that ERA provides at least some leverage for the funding of new technologies and plants for processing E-WASTE locally, hence its nominal allocation of R55 million to this objective.

ERA will still decide whether to locate the Technology Investment Fund with a specialist enterprise funding agency or whether to set up an internally managed, but externally supported / adjudicated process for deciding these investments. The budget allocated for this purpose can provide no more than some leverage for other funding options and the optimal structures how such funds can be applied for and subsequently accessed will be also further explored.

[74](ATE, 2012) Page 67

[75]such as separation, shredding, granulation and dismantling of parts and value/ problem waste bearing fractions

10.3.3 ERA Education and Awareness

Education and awareness	**5%**	**R 25 000 000**

ERA will have to make very significant investments into effective communication and programmes that inform EEE consumers about the potential dangers of improper, and the potential value of proper E-WASTE treatment and disposal.

These campaigns will have to be of a general public nature using various media, as well as the production of very specific informational materials for very specific markets. In addition to the media production, it will also have to co-opt service providers who are best suited to carry the message/s to specialised audiences.

Some education and awareness will be outsourced to competent entities outside of ERA, and some will be managed directly by ERA.

- The PRO will require to undergo a branding exercise to develop a brand logo and identification to be applied throughout the entire network that consumer will identify with.
- Uniform signage for all participating collection points will be prepared to ensure that consumers identify where they can deposit E-WASTE to ensure appropriate treatment.
- In developing national awareness-raising campaigns to support the proper disposal of E-WASTE the following stakeholders have been identified as being key players for ERA to work with - regional and local authorities, educational facilities, business, collection points.

The type of activities identified are specific recycling collection events, free take back from schools, colleges and universities, school recycling competitions and local cultural event sponsorship. In addition, targeted advertisement through the most effective media to address the nation's demographics and other creative methods for interaction and engagement with the population will be developed on an ongoing basis.

Most important in the start-up phase of the IndWMP, is the need to get a consistent brand across to the EEE consumer and resulting post-sales E-WASTE generator. This means, as a minimum, that every accredited stakeholder will have to prominently display their association and collaboration with ERA and hence the IndWMP. Of equal importance will be the need to ensure that the public has access to the infrastructure deployed to facilitate good disposal and recycling practices. There can be nothing more frustrating to the consumer to get the message without the physical evidence that something is being done to facilitate their compliance with the system.

10.3.4 ERA Recycling (E-WASTE Handling) Subsidy

Recycling (E-WASTE handing) subsidy (see also 10.4)	**26%**	**R 145 200 000**

The following E-WASTE recycling subsidy will apply. Section 10.4 below provides a detailed explanation on how this amount was derived at and how the subsidy is planned to be applied to the projected E-WASTE collection and recycling volumes.

- General E-WASTE @ R3.50 / kg
- CRT @ R6/kg – assumed to be 10% of E-WASTE
- Very problematic/hazardous fractions @R30/kg – assumed to be 1% of E-WASTE

10.3.5 ERA Enterprise Development

Enterprise development TOTAL	**36%**	**R 197 759 980**

Elements
There are 6 Enterprise Development elements covered in the IndWMP. These are:

- Buy-back Centres (Tier 3)
- Drop-off Points (Tier 3)
- Household, street and landfill collection (Tier 4)
- Logistics network through E-WASTE transporters from Tier 3
- Call-in collection service (limited to qualifying groups)
- Inspectorate

All of the elements are designed to overcome the key challenges discussed in Chapter 4 of the IndWMP and as further described in Appendix 15 (outlining the key strategies and elements of the ERA Local Economic Development programmes). What follows is a brief set of indicators reflecting what contribution each of these enterprise elements will make towards the attainment of the IndWMP objectives. Please also refer to Appendix 11 for a summary of the cost items.

10.3.5.1 Buy-back Centres Capital Support (Tier 3)

Buy-back Centres Capital Support (Tier 3)	**R 100 000 000**

Table 8: ***Capex per Buy-back Centre*** ***X 400 p.a.***

Item	**Amount**	**Notes**
Container	R 80 000	Fitment details to be determined
2 ton vehicle	R 90 000	LOCAL collection only
Equipment & PPE	R 50 000	Scale, tools, crane, baler, etc.
Furniture & Fittings	R 10 000	PCs, desks, chairs, etc.
Training	R 20 000	Refurbishment, dismantling OHS,, etc.
TOTAL	**R 250 000**	**each**

There are currently 600 permanent E-WASTE collection points across South Africa. It is estimated that they each contribute about 6 tons p.a. to the current captured E-WASTE supply. These vary in format and volumes from simple 120L bins to specialised large volume containers to open spaces in municipal dumps. As to their physical locations, they can be found inside shopping malls, outside shops and a host of other locations.

ERA will work towards transforming approximately 400 of the 600 points into Buy-back Centres with a more accessible and equitable footprint that covers a wider geographic area so that more of the country and more of its demographic groups can access these and participate more constructively in E-WASTE collection and recycling.

It is envisaged that a sizable number of the existing drop-off points would want to defer to the new E-WASTE system and to relocate operations to the Buy-back centres. For reasons of financial and practical feasibility, and in order to be able to make fast progress in the planned formalisation and upgrade of existing drop offs into buy-backs, allowance has been made to forgo the need for obtaining a waste management license at Tier 3 level and ERA will ensure that strict conditions for managing and treating E-WASTE are set and met.

No allowances have been made for the Buy-back centres' operational income as the average income derived from the E-WASTE recycling subsidy alone, based on 20 tons of E-WASTE collected and treated would amounts to an average of R70,000 p.a. per enterprise.

A diversified business model that includes other products and services must be developed for each enterprise to be sustainable and support a minimum of 3 jobs each. It is anticipated that buy-back centres will also derive higher income from refurbishing EEE assets and from trading with Tier 1 and 2 recyclers who will also offer competitive prices for the high value fractions in the total stock of E-WASTE being offered by Tier 3 enterprises.

The location of Buy-back centres located next to or near to municipal landfill sites will be prioritised.

10.3.5.2 Drop-off Point Capital and Operations Support (Tier 3)

Drop-off Capital & Operations Support (Tier 3)	**R 30 400 000**

Table 9: ***Capex per Drop-off Point*** ***X 200 once-off***

Item	**Amount**	**Notes**
E-WASTE Deposit Facility	R 20 000	Branded Infrastructure Support
Equipment & PPE	R 10 000	Staff Protection and Handling Equipment
Sub-total	**R 30 000**	**each**

Table 10: ***Operational Support per Drop-off Point*** ***X 200 p.a.***

Item	**Amount**	**Notes**
Security / Staff (2 shifts)	R 90 000	Staffing subsidy
Training	R 8 000	OHS and PPE
Space Rental	R 24 000	Contribution
Sub-total	**R 122 000**	**each**
TOTAL (incl. Drop-off point Capex)	**R 152 000**	**each**

It is assumed that approximately 200 of the existing 600 permanent drop-off and collection points will remain as Drop-off points and the other 400 will transform into Buy-back centres as discussed above.

The budgets presented above is an allowance only - and is indicative - so as to encourage retail participation in the E-WASTE management.

It is not Planned that Drop-off points will be trading or recycling E-WASTE and that E-WASTE collected through this network will be offered to Tier 1 and 2 E-WASTE recyclers at no cost.

10.3.5.3 Capital Support for Household / Street and Landfill E-WASTE Collector (Tier 4)

Capital & Operations Support (Tier 4)	**R 1 880 000**

Table 11: ***Capex per Tier 4 E-WASTE Collector*** ***x 400 p.a. over 5 years***

Item	Amount	**Notes**
3-wheel tricycle	R 2 500	(industrial)
Carriage box	R 1 200	
Bicycle Repair Kit / Spares	R 500	
PPE Kit (branded)	R 500	
TOTAL	**R 4 700**	**each**

As discussed earlier, 2,000 informal E-WASTE collectors will be recruited to operate as E-WASTE ambassadors and will comprise the Tier 4 E-WASTE enterprises. These will grow in increments of 400 p.a. over 5 years.

Tier 4 E-WASTE collectors will be free to trade their E-WASTE only with Tier 3, 2 or 1 E-WASTE recyclers. This will depend on who is most accessible and who offers the best rate for E-WASTE.

It is critical that Tier 4 E-WASTE collectors trade all their E-WASTE with only into ERA registered recyclers and that they desist from the unwanted E-WASTE recycling practices discussed in section 4.6.

Tier 4 E-WASTE collectors will be eligible for a minimum of R3.50 per kg of E-WASTE. Over and above the minimum recycling subsidy, Tier 1, 2 and 3 E-WASTE recyclers would be advised to pay an additional sum for the E-WASTE in order to remain competitive.

Training of Tier 4 E-WASTE collectors will be conducted by ERA staff and will start at the point when they sign their Codes of Good Conduct with ERA.

It is envisaged that Tier 4 E-WASTE collectors, with the capex support and ERA branding will be able to carry significantly more E-WASTE, cover a larger area and have more credibility with the public.

10.3.5.4 Transport /and E-WASTE Transfer Fees

Annual E-WASTE Transporter Service Contracts (Transporter Fee/kg PLUS Transporter Travel Fee)	**R 29 839 980**

Table 12: ***Assumptions for Transporter Enterprises***

Collection Infrastructure	**Year 1**	**600**	Collect from Tier 3 only
Buy-back centres	Year 1	400	Tier 3
Drop-off points	Year 1	200	Tier 3
Number of Transporters	**Year 1**	**60**	**10 sites / transporter**

The E-WASTE Transport or Transfer enterprise will operate only between Tiers 3 to Tiers 1 and 2.Tiers 1 and 2 are responsible for the transportation of E-WASTE that is sourced independently of Tier 3, as well as for any transportation costs from their operations to downstream markets.

From Tier 3 onwards, all E-WASTE is in the E-WASTE management system. There is total control and accountability for all E-WASTE and the Transporters and their administration are critical to this project of E-WASTE control and accountability.

Each transporter will have an average of 2 collections per day for which proper recording of each transaction is critical. There will therefore be an average of 10 collections per week for each Transporter. Each Transporter will service between 5 and 10 Buy-back centres and Drop-off points, assuming that weekly collections are done at each point serviced.

Transporters will receive an E-WASTE transport fee for each kg of E-WASTE collected and for each kilometre travelled transferring that E-WASTE.

Table 13: ***Transporter Fees - Per Kg of E-WASTE Transferred*** ***x 60 - Year 1***

Over-all		**R 14 000 000**
5,600 tons carried p.a.	5 600	p.a.
Fee per kg	**R 2.50**	
Each Transporter average daily KGs	354	**R885** daily based on weight
Total Transport Weight Fees	**R 14 000 000**	Shared between 60 Transporters

Table 14: ***Transporter Fees - Per Km of Travel*** ***x 60 - Year 1***

Over all		**R 15 839980**
Fee per km	**5.00**	
Total Kms travelled per annum	3 168 000	Total for all 60 Transporters @ 200km per day each

Total Kms travelled per month	264 000	Estimate 22 working days pm
Total Kms travelled per day	12 000	60 Transporters each doing 200km per day
Each Transporter daily Kms	200	**R1000.-** daily for transport
Transporter Travel Fee/year	**R 15 839 980**	**S**hared between 60 Transporters

Total per Transporter = R1,884 p.d. x 22 days = R39,600 per month x 12 months = R 497 333.-

10.3.5.5 E-WASTE Call-in Service – Operations and Capex

E-WASTE Call-in Service	**R 21 240 000**

Table 15: Operational Support per Call-in Service Team *X 60 year 1*

Item	Amount	Notes
Number of Call Service Units	120 people in teams of 2 people each	60 Teams distributed over 9 Provinces
Basic Salary (Driver & Assist)	R 12 000	pm per Team
Basic Salary (Driver & Assist)	R 144 000	p.a. per Team
Vehicle running costs	R 60 000	p.a.
Basic Operations Cost	**R 204 000**	p.a. for per Team
Total for all 60 Service Units	**R 12 240 000**	**p.a. for 60 Teams**

Table 16: ***Capex per Call-in Service Team*** ***X 60 year 1***

Item	Amount	Notes
Vehicle costs	R 150 000	each
Total for 60 Vehicles	**R 9 000 00**	**Total**

It is planned that each of the 9 provinces will have an E-WASTE call-in collection service that is provided at no charge to the client. More teams will be deployed in provinces that are mostly of rural nature. This service will not be eligible for an E-WASTE transport fee and will not be able to offer an E-WASTE recycling subsidy to the client.

It is envisaged that this service will be provided to households that are rural, indigent and to pensioners. Further criteria for eligibility will be developed by ERA. The E-WASTE Call-Service will be co-ordinated by ERA but offering the in- call services will be based on the assumption that reasonable amounts of E-WASTE warrant a pick-up and some pre-consolidation between various households plus public facilities in the same rural area will be a likely requisite. The service may be linked to EEE repair and refurbishment services, as arranged with/by ERA.

10.3.5.6 E-WASTE Inspectorate

E-WASTE Inspectorate	R 14 400 000

Table 17: ***Operational Support per Inspectorate*** ***X 60 year 1.***

Item	Amount	Notes
Fee per Inspector p.m.	R 15 000	2 inspections / audits per day
Fee per Inspector p.a.	R 180 000	p.a.
Transport per Inspector	R 60 000	p.a.
Total cost per Inspector	R 240 000	p.a.
Fees & transport - all Inspectors	**R 14 400 000**	**Total p.a.**

The Inspectorate is a key function in the process of conducting due diligence work among E-WASTE recyclers who wish to register and be accredited for participation in the IndWMP. This due diligence will critically feed into the adjudication and verification process, especially for Tier 4 and 3 E-WASTE enterprises, as well as for Transporters and bidders for the Call-in service contracts.

The Inspectorate is key function in the process of verifying the amount of E-WASTE being transacted in the E-WASTE management system, as well as the practices of registered and accredited E-WASTE recyclers.

The inspectorate has an important role to play in monitoring the practices and quantity of E-WASTE being managed in the system, and as such will have an important role to play in the review and audit process as it relates to E-WASTE recyclers.

10.4 E-WASTE Recycling Subsidy / Handling Fee

ERA will provide each of the 4 Tiers that comprise the E-WASTE collection and recycling network with an E-WASTE handling fee of R3.50 per kg of E-WASTE which they collect and recycle.

There will be an additional R6 per kg of CRT and equivalent class of E-WASTE collected and traded into the E-WASTE management system, and a further R30 per kilogram of battery and equivalent problematic/high hazardous E-WASTE traded into the system.

As stated in section 4.10 of the IndWMP, there will be **no E-WASTE recycling subsidy due** to the following classes of persons:

- Corporate EEE consumers
- Household consumers that dispose of their E-WASTE at household level and where the latter gets collected from them by municipal services or Tier 4 street collection services, or for those using the E-WASTE Call-in service
- E-WASTE dropped off at Drop-off points.

However, any household consumer or corporate consumer that trades their E-WASTE directly with Buy-back centres or Tier 1 and 2 E-WASTE recyclers will be eligible for the minimum E-WASTE recycling subsidy, and these E-WASTE recycling services would be well-advised to be competitive in their offer to such clients.

The purpose of the E-WASTE recycling subsidy is essentially to ensure the following:

- All E-WASTE offered is accepted by Tiers 1, 2, 3 and 4 – without exception. To be explicit – no E-WASTE recycler will trade only selected E-WASTE fractions.
- No E-WASTE will be treated / recycled in a manner that is not compliant with the standards set in the IndWMP.
- No E-WASTE will be disposed of in general landfill sites and no problematic and/or hazardous fractions will be stockpiled, except for where it is necessary to build volume that it can be economically traded or disposed of. In any event, all stockpiles should be cleared out on an annual basis at the very least.
- All E-WASTE received and processed will be fully and truthfully accounted for.

What follows below is a layout of the working assumptions that drives the E-WASTE recycling / handling fee payable on every kg of E-WASTE collected and recycled / treated. At no point must the E-WASTE recycling subsidy be construed as the only financial exchange between those trading the E-WASTE. It is expected that the subsidy is sufficient for an E-WASTE recycler to cover its cost in treating the low or no value (often problematic as well as hazardous) fractions and at NO stage must the cost of treating those fractions be passed onto the client supplying the E-WASTE. It is also expected that a portion of the income realised from trading high value fractions be included in the offer to the E-WASTE supplier.

A first survey was undertaken in April 2015 by Steercom whereby an AVERAGED treatment price for the recycling of different categories of E-WASTE was developed as a first estimate. This Steercom Member internally driven exercise was exclusively undertaken with E-WASTE recyclers that possess the relevant hazardous waste management licenses, and who expressly deal in E-WASTE recycling and treatment only. The latter means that those recyclers dealing with other waste streams and scrap metal dealers were expressly excluded from the exercise. Due to financial constraints (as the E-WASTE Steering Committee is a purely voluntary committee), the Department of Environmental Affairs had to be approached to play the role of the "Black Box" in order to be able to provide anonymous information arising from the recycling price survey.

Note: Agreement by Steercom was reached to follow-up this first very limited survey with a detailed evaluation/research of South African based E-WASTE recycling cost through the ERA PRO and within its first year of operation and as envisaged through an independent, reputable third party auditing service. With their help ERA intends to conduct a much more detailed assessment of all types of E-WASTE to accurately determine the differential recycling costs of all the different E-WASTE categories. The detailed assessment will assist ERA to continuously verify, determine and allocate the correct E-WASTE recycling subsidy/ handling fee for every E-WASTE Category. In addition, it will also enable ERA to consider the evolution of costs over time, to make projections for the future, notably depending on the variation of raw material prices, and to make a sensitivity analysis in order for the subsidy to be impactful and have the desired outcome.

The E-WASTE recycling subsidies presented below are the result of the outcome of the first survey/ evaluation.

It is further recorded that the key factors driving the cost / price of E-WASTE recycling are the following:

- Transport – biggest single cost driver
- Legal compliance and obtaining the relevant licenses and permissions
- Linked to legal compliance, the location of operations and conditions for compliant operations
- Legal disposal of E-WASTE
- Labour, equipment and overheads

Table 18: ***Calculation of E-WASTE recycling subsidy / handling fee and Projections on budget required***

	E-WASTE handled CURRENT SCENARIO		**Total E-WASTE Handling Subsidy**
Tier 1	17 500 tons	*Subsidy of @R3.50/kg*	R 61 250 000
Tier 2	2 000 tons	*Subsidy of @R3.50/kg*	R 7 000 000
Tier 3	3 600 tons	*Subsidy of @R3.50/kg*	R 12 600 000
After 5 years			
Tier 4	2 000 tons	*Subsidy of @R3.50/kg*	R 7 000 000
TOTAL E-WASTE	**25 100 tons**	*Subsidy of @R3.50/kg*	
General E-WASTE @ 100%	**25 100 tons**	*Subsidy of @R3.50/kg*	**R 87 850 000**
CRT @ 10% of total volume	**2 510 tons**	*Subsidy of R6/kg*	**R 15 060 000**
Problematic/High Hazardous fractions@ 1% of total volume	**251 tons**	*Subsidy of R30/kg*	**R 7 530 000**
Total subsidy at current E-WASTE collection and recycling rates			**110 440 000**

Table 19: Cost Based Calculation of E-WASTE Recycling Subsidy/Handling Fee and Projections over 5 Years (in line with E-WASTE collection and recycling targets set)

	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Total volume collected	**33,000 tons**	**43,000 tons**	**55,000 tons**	**72,000 tons**	**93,000 tons**
Cost: General E-WASTE @ 100% (Rand)	115 500 000	150 500 000	192 500 000	252 000 000	325 500 000
Cost: CRT @ 10% of total volume (Rand)	19 800 000.	25 800 000	33 000 000	43 200 000	55 800 000
Cost: Problematic/High Hazardous fractions@ 1% of total volume (Rand)	9 900 000	12 900 000	16 500 000	21 600 000	27 900 000
Total Recycling Subsidy over 5 years (Rand)	**145 200 000**	**189 200 000**	**242 000 000**	**316 800 000**	**409 200 000**

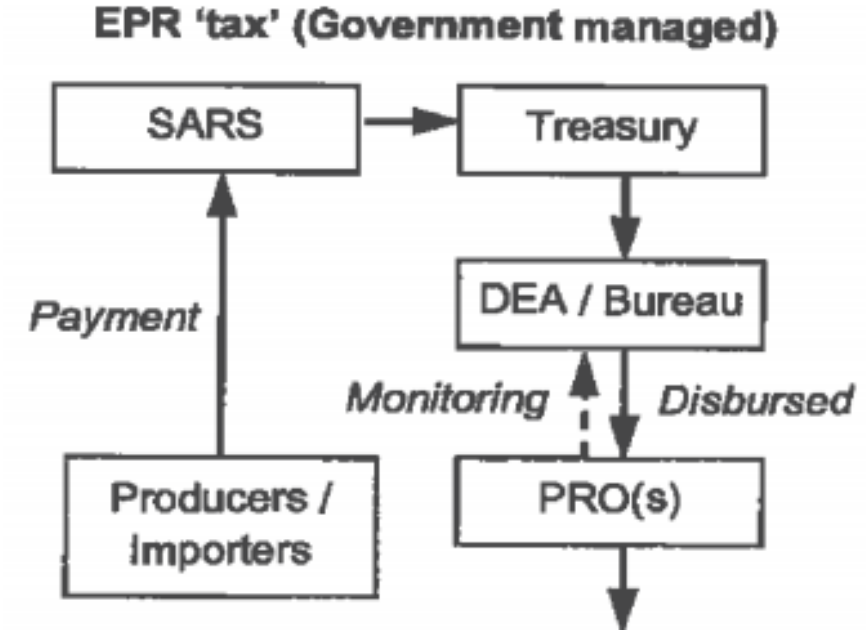
ERA will be conducting a more detailed assessment of e-waste recycling costs in the first year of its operation. The assessment will provide detail to accurately determine the differentiating recycling costs of all the different E-WASTE categories.
The detailed assessment will assist ERA to continuously verify, determine and allocate the correct E-WASTE recycling subsidy/ handling fee for every E-WASTE Category. In addition, it will also enable ERA to consider the evolution of costs over time, to make projections for the future, notably depending on the variation of raw material prices, and to make a sensitivity analysis in order for the subsidy to be impactful and have the desired outcome.

10.5 E-WASTE Management Levy / Fee

It is clear that "Producers" as the key stakeholders in the EEE industry and defined further in the Notice given as described in the "Definitions" must contribute financially towards the effective management of E-WASTE, as contemplated by Sections 13 A and 13B of the NEMWA 2008 (as amended) and many EEE producers accept this principle.

Article 6 (1) (m) of the Section 28 notice (No. 41303) requires the IndWMP to use the "EPR 'tax' (Government managed)" model set out in section 6.3 of the "National Pricing Strategy for Waste Management" (No. 40200).

Figure 7 - EPR 'tax' Government managed model



The Government managed model in figure 7 above sees EPR fees collected by SARS at the point of the producer placing product on the market and those fees then entering the Treasury. The PRO applies for funding from the Waste Bureau based on the Plan adopted to achieve the waste collection and recycling targets, and they in turn request the funds from Treasury. Effectively the determination of the cost of recycling operations by the ERA PRO should set the baseline for the EPR fee collected by SARS.

As many of the producers responsible for EEE in South Africa are multinational corporations, they are already exposed to the imposition of levies, standards and EPR programmes in other global markets which demand, among other things, the reduction or elimination of toxic substances in the manufacture of their products, as well as practices that contribute towards the effective protection of the environment from any negative effects of E-WASTE management.

The setting of an E-WASTE management levy is directly related to the budget associated with the E-WASTE IndWMP. Ideally, it will match the budget requirement of the IndWMP exactly. Due to time constraints and a lack of more detailed information regarding specific treatment liability costs, the E-WASTE management levy will be applied to all EEE listed in Appendix 1: "Schedule of EEE Products". The recycling subsidy is set at a uniform rate based on the weight of the EEE product placed on the South African market. This is the case irrespective of whether the products are imported or locally produced, or whether it is new or second-hand equipment that is responsible for the generation of E-WASTE. The only exclusion would be the EEE that is already present in the South African market and/or that is being refurbished for sale.

According to the majority of Steercom Members it would be far more desirable to base the levy on cost of recycling for a product in its own POM category. Such a strategy would see the costs spread appropriately across producers for E-WASTE from different EEE products. Those products that can retain some value will have a lower fee applied than those that incur cost for treatment. As such a more refined levy calculation is listed as a target for the next 5-year plan to make it more equitable and effective.

The ERA PRO assumes that the budget presented for the implementation of the IndWMP will be fully covered by the DEA/Waste Bureau, and that the E-WASTE levy will be aimed at specifically raising this budget. This assumption is vital to the successful implementation of the plan.

Additionally, an undertaking is provided by ERA that any unforeseen revenues will be re-invested to further expand the collection and recycling of E-WASTE, the training and support of new entrepreneurs from previously disadvantaged sectors, etc.

10.6 Jobs Created Over 5 Years

The E-WASTE IndWMP, if properly implemented, will lead to very significant enterprise and job growth. No calculation has been made regarding the development of E-WASTE processors and downstream markets and the jobs that these will create. Inasmuch as the development of these downstream markets are critical to the success of the overall E-WASTE management system, there is still much that needs to be done to determine the exact technologies and plants that ERA will invest in or for whom ERA will leverage investments. As the Plan currently stands, ERA intends to help consolidate important E-WASTE fractions that can feed significant local E-WASTE pre-processing technology and plant development.

Below is a table format of the enterprises and jobs which the plan intends achieving:
If successfully implemented, the IndWMP as presented herein will create a minimum of 10,900 new jobs.

Table 20: Planned Supported Enterprises and Number of Jobs Created

Enterprises Supported	**Current No.**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total (5 YRS)**
		new units	new units	new units	new units	new units	
Tier 1 Enterprises	**7**	2	2	2	1	1	**15**
Tier 2 Enterprises	**25**	5	5	5	5	5	**50**
Tier 3 Enterprises - Drop-off (Collection Points)	**600**	200	20	10	10	10	**250**
Tier 3 Enterprises - Buy-back centres		400	400	400	400	400	**2 000**
Tier 4 Enterprises	-	400	400	400	400	400	**2 000**
e-Waste Transporter	-	60	40	40	40	40	**220**
e-Waste Call Service	-	60	10	10	10	10	**100**
Inspectorate	-	60	40	40	40	40	**220**
Total No. Enterprises	**632**	**1 187**	**917**	**907**	**906**	**906**	**5 455**
Number of FORMAL Jobs Created and Maintained	**Current**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total (5 YRS)**
		additional	additional	additional	additional	additional	Total Jobs
ERA Operations	-	70	7	8	8	9	**102**
R&D and Technology Investments	-	30	3	3	4	4	**44**
Education and Awareness	-	20	2	2	2	3	**29**
	-	**120**	**12**	**13**	**15**	**16**	**176**
Enterprise Development and Recycling Sector Jobs		additional	additional	additional	additional	additional	Total Add. Jobs
Tier 1 (7 companies current providing ~ 70 jobs each)	**490**	140	140	140	70	70	**560**
Tier 2 (x25 companies current providing ~ 25 jobs each)	**625**	125	125	125	125	125	**625**
Tier 3 Buy-backs (x400 current) @ 2 personnel	**800**	1 200	1 200	1 200	1 200	1 200	**6 000**
Tier 3 Drop-offs (200 current) @ 1 personnel	**200**	800	80	40	40	40	**1 000**
Tier 4 (NONE are formalised currently)	-	400	400	400	400	400	**2 000**
	2 115	**2 665**	**1 945**	**1 905**	**1 835**	**1 835**	**10 185**
e-Waste IndWMP Support Services		additional	additional	additional	additional	additional	Total Add. Jobs
e-Waste Transporter	-	60	40	40	40	40	**220**
e-Waste Call Service	-	60	10	10	10	10	**100**
e-Waste Inspectorate	-	60	40	40	40	40	**220**
	-	**180**	**90**	**90**	**90**	**90**	**540**
					Total ADDITIONAL JOBS		**10 901**
					Total (Existing and New)		**13 016**

10.7 ERA and the Waste Management Bureau[76]

The National Environmental Management: Waste Amendment Act, 2014 (Act No. 26 of 2014), passed in June 2014 led to the establishment of a Waste Management Bureau in 2017. Since then it advertised job positions in that Bureau for a long list of people with the intention to get involved with activities with the following objectives:

- function as a specialist implementing agent within the Department in respect of matters delegated to the Bureau in terms of this Act;
- promote and facilitate minimisation, re-use, recycling and recovery of waste;
- manage the disbursement of incentives and funds derived from waste management charges contemplated in sections 13B and 34D for the minimisation, reuse, recycling, recovery, transport, storage, treatment and disposal of waste and the implementation of industry waste management Plans;
- monitor implementation of all approved IndWMPs and the impact of incentives and disincentives;
- progressively build capacity within the Bureau to provide specialist support for the development and implementation of municipal waste management plans and capacity building programmes; and
- support and advise on the development of waste management plans, tools, instruments, processes, systems, norms, standards and municipal waste management plans and capacity building programmes.

The E-WASTE IndWMP complies with the provisions of the National Environmental Management: Waste Amendment Act, 2014 (Act No. 26 of 2014) and is in line with the globally accepted principles of Extended Producer Responsibility.

[76] The functions of the Waste Bureau are provided in order to locate ERA within the legal and governmental landscape

11. Conclusion

In conclusion, the E-WASTE Steering Committee wishes to highlight the key benefits of this Plan as follows:

- The IndWMP establishes an E-WASTE management system and solutions for the present and future demand of growing EEE consumption in South Africa.
- The appropriate handling of E-WASTE can both prevent serious health and environmental damage and also recover valuable materials, especially metals.
- The development of a sustainable E-WASTE management industry will contribute significantly to the development of a green industry sector in South Africa that will create job opportunities in line with the National Development Plan (NDP) objectives.
- The E-WASTE management levy presents no significant increased cost of ownership of EEE to consumer/ end users. The Plan is based largely on a solution design that draws financing from the intrinsic value of material while the producers ensure that they contribute to the management of the problematic elements of the E-WASTE management challenge.
- The Plan promotes E-WASTE management as a viable industry and draws in a large number of community enterprises across townships, rural areas and among the youth. Alongside the investments and funding flows that promote this objective, the Plan also makes significant provision for education, training and awareness raising, as well unique home-grown technologies and IP for export to the rest of the African continent.
- The Plan promotes and supports the better local utilization of recovered materials through local beneficiation where feasible.
- The Plan sets out to maximise E-WASTE collection and the consolidation of specific E-WASTE categories that will secure much needed recycling technology investments.
- The Plan integrates the informal waste collector as a reality of the South African landscape and promotes their growth as a respectable and recognised part of the E-WASTE management system.
- The Plan promotes sustainable recycling operations and also considerably contributes to reducing greenhouse gas emissions by mining E-WASTE to recover valuable materials in an environmentally sound and correct manner. In so doing, it requires only a fraction of the energy needed to mine virgin ores in nature.

12. Bibliography

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Appendixes

1. Schedule of EEE Products Covered by the ERA IndWMP

   1.1 Electrical and Electronic Products HS Codes

2. ERA NPC Memorandum of Incorporation
3. ERA Steering Committee, Delegates, Meetings and Processes
4. 29 October 2014: e-Waste Consultative Conference Attendees / Invitees
5. DEA Terms of Reference for ERA Steercom
6. Plan Checklist and Paragraph References in the ERA IndWMP
7. List of Producers (OEMs), Importers, Distributors
8. Record / Minutes of E-WASTE IndWMP Steercom Meetings

   (Available on Request)
9. B-BBEE Provisions in the Awarding of Contracts and Enterprise Support
10. E-WASTE Recycle, Reuse, Disposal Treatment Options and Volumes
11. Headline Targets, Programmes and Budgets of E-WASTE IndWMP
12. Optimising the Prevention, Reduce and Reuse Potential of E-WASTE
13. Detailed Legal Context for the ERA E-WASTE IndWMP
14. Contextual Analysis- E-WASTE Management in South Africa
15. ERA Local Economic Development Plan
16. Industry vs. Government EPR models