

1
2
3 ***Alternatives for Financing Waste: Implications***
4 ***for Ghana's Growing Electronic and Electrical***
5 ***Equipment Waste***
6
7

8 **ABSTRACT**

9 The waste of electrical and electronic equipment pose an environmental and human health
10 challenge for some developing countries, including Ghana. Despite such challenges, it
11 contributes to job creation and income generation if properly collected and processed. This
12 type of waste may contain precious minerals including gold and mercury. However, the
13 processing of such waste is dominated by the informal sector. Due to the availability of
14 finance, they resort to unhealthy such as burning and crushing as a means of processing this
15 waste, thereby, exposing themselves and the environment to poisonous metals and
16 substances. To curtail the problems created by this waste, the government proposed the
17 establishment of fund to enable the country secure the needed capital to deal with this waste
18 problems. The paper uses documentary review to assess the proposed government approach
19 to funding of this waste. It proposes an alternative model of financing of this waste. It
20 recommends, among other things, the need to promote this sector as a business venture and
21 encourage the participation of private, public, foreign and domestic investment. The said
22 investment is expected to promote the acquisition of the needed technology.

23
24 **KEYWORDS:** *Financing, Electrical, Electronic Waste, Ghana*

25
26 **1.0 INTRODUCTION**

27 Ghana launched the National ICT Policy in 2003 with the goal of engineering an ICT-led
28 socio-economic development process with the potential to transform Ghana into a middle
29 income, information-rich, knowledge-based and technology-driven economy and society [1].
30 The focus of the policy was to promote the deployment of ICT in all areas and sectors of the
31 economy, including the production and distribution of goods and services as well as the
32 modernization of agriculture, health and governance. Among the critical areas targeted for the
33 deployment of ICT also included education and health care delivery. As a key success factor,

34 taxes on ICT equipment for health and education purposes were reduced or removed. These
35 included mobile phones [2][3]. All these culminated into an influx of ICT gadgets and
36 equipment being imported into the country, especially computers for educational or health
37 purposes. A large volume of these came through donation to schools and charity homes.
38 Apart from computers, another electrical equipment that comes in as gifts is hospital
39 equipment, including used X-ray machines, diagnostic machines, and ICT scanners among
40 others.

41 A 2011 report, on Ghana Electronic Waste (e-waste) Country Assessment showed Ghana
42 imported 215,000 tons of electrical electronic equipment (EEE) with 64,500 (30%) being
43 new. As [4] and [5] submit, about 70% of this electrical and electronic equipment imported
44 into the country are used products. Furthermore, 97,825 (65%) of the used ones come into the
45 country in good working condition. Another 37,625 (25%) can only function after repairing
46 or refurbishing them. An estimated 15,050 (10%) come into the country are broken and
47 unsalvageable. Whether these EEE come into the country used or brand new, what matters is
48 how their end-of-life is managed. This is because, waste of electronic and electrical
49 equipment (WEEE) if improperly handled have negative health and environmental
50 implications for the society. WEEE is found to be a valuable resource if properly managed.
51 However, the current situation of WEEE in Ghana is more of a menace than a blessing.
52 Several studies have documented the negative health, environmental, social and economic
53 impact of electronic waste, especially in the cities where landfills are located.

54 These studies had originated from known areas of EEE problems including Ghana [6] and in
55 India [7]. Furthermore, [8] and [9] conducted research on the same subject in China. Findings
56 from such studies indicate significant display of toxic elements in the blood stream, serum,
57 scalp hair, human milk and urine of people working or living in places of massive e-waste.
58 Waste management is a major issue in major cities in developing countries, especially in Sub-
59 Saharan African countries including Ghana.

60 Meanwhile, there are few companies, limited technologies available for the collection, sorting
61 and processing of e-waste in the country. This comes against the backdrop of limited
62 investment into e-waste management, despite the increased in the generation of such waste.
63 According to [10], about 30% of the EEE imported in 2009 did not function and therefore
64 were waste. The resultant effect is about forty thousand (40,000) tonnes of waste. This view
65 is supported by [11], who put the total EEE in the same at 215,000 tons, with 70% being used
66 products. With the coming in of the ICT policy and the penetration of ICT in Ghana, the
67 volume of e-waste continues to increase in the country. However, there are few formal e-

68 waste management companies in the country to handle the huge e-waste generated. For the
69 few companies that operate in the sector, their main activity is the collection and dumping of
70 the waste at designated landfill sites. The sector is highly dominated by informal sector,
71 mainly small and medium enterprises (SMEs). These businesses are involved in the
72 collection and processing of e-waste in the cities and towns. However, their methods of
73 processing have been crude. For instance, burn e-waste to extract copper wires contained in
74 this equipment. Appendix 1 and 2 show an informal e-waste processing activity at
75 Agbogloshie in Ghana as contained in the e-waste country assessment report on Ghana,
76 published in 2011 under SBC e-Waste Africa Project.

77
78 Such approach to dismantling WEEE leads to loss of important and valuable elements
79 (especially gold and mercury) contained in this equipment. If properly managed, WEEE has
80 the potential to create jobs, generate income and improve the livelihood of those engaged in
81 such businesses. A paper published in the Seattle Journal of Environmental Law, in 2015,
82 revealed that 10 to 13,000 metric tons of WEEE is processed in per year in only Accra. This
83 contributes about US\$105 million to US\$268 million into Ghana's economy. Furthermore,
84 the processing of WEEE using these crude methods sustains between 121,800 and 201,600
85 people in Ghana. What this means is that with the right investment and efficient recycling
86 facilities, the country could earn more, create more jobs and improve the standard of living
87 for those engaged in the business. The paper analysis the suggested mode of financing WEEE
88 as contained in the E-Waste Act of Ghana and proposes other alternative modes of financing
89 e-waste in Ghana. The rest of the paper is divided into FIVE parts. Part two looks at the
90 theoretical framework and the existing financing models. The third part looks at looks at the
91 research method. The framework for financing WEEE is in Part four. Part five looks at
92 conclusion and recommendation.

93 **2.0 THEORETICAL FRAMEWORK**

94 It established in previous studies [12] e-waste is a major problem because it causes
95 environmental damage and a severe human health concerns if not properly handled. This is
96 because it often contains high amounts of toxic and environmentally sensitive materials and
97 thus, hazardous to humans and the environment, if improperly disposed or recycled [12].
98 This, notwithstanding, e-waste is found to provide huge business opportunity due to the rich
99 minerals it may often contain. This view is expressed in the *waste-to-resource* (WTR)
100 ideology. The WTR is supported by the wealth creation and profit maximisation theories of
101 the firm. High profit margins may lead to growth and survival of the firm. Firms create

102 wealth through innovation and invention of new products. The WTR to creating value occurs
103 through refurbishment, recycling, reclaiming or re-use.

104 Furthermore, production theory suggest that the production is complete when it reaches the
105 final consumer. This WTR philosophy extends the production ideology, making producers
106 the final consumers through their extended responsibilities towards the environment. By
107 extended producer responsibility (EPR), producers are made accountable for complete life
108 cycle of the product from the source of raw material, through to processing, distribution as
109 well as the disposal after the product's useful life. This include strategies such as take back
110 reuse, reduce, recycling and recovering approaches [13] [14]. [15], emphasised on post-
111 consumption phase of the product's life cycle as they talk about EPR. Previous studies have
112 emphasised on the competitive advantage gained by firms due to better design impact of EPR
113 [16]. From purely corporate social responsibility (CSR) perspective, [17] opined that EPR is
114 an indication of corporate stewardship and good citizenship.

115

116 However, despite the major concerns, e-waste is a potential source of income if the valuable
117 materials contained in them are properly recovered.

118

119 Due to the complicated nature of e-waste and the harm it may cause to those involved in the
120 e-waste business, it is necessary to use the right technologies in its processing. However, this
121 comes with the relevant cost. According to [12], in some instances, the benefits for collection
122 and recycling of e-waste might be less than the revenues generated from the recovered materials
123 if the right technology is not used. This calls for adequate investment into the sector.

124

125 From the stakeholder theory perspective, financing the sector should be the responsibility of all
126 the actors within the value chain; i.e. producers, distributors and consumers, with the government
127 and international community acting as the interveners. The theory is of the view that there are
128 various groups in society that have interest in the activities of business, and hence has the ability
129 to influence how a firm conducts its activities. It opines that the power and influence of the actors
130 significantly influence corporate practices. Analysing the critical role of these groups in society,
131 [18] based on this theory identifies several interest groups in a firm's activities including
132 suppliers, shareholders, civil society organisations, the media, consumers, competitors as well
133 as state and its agencies.

134

135 Similar to other industries, interest groups in the electronic and electrical equipment industry
136 has the power to influence how corporate bodies in sector conduct business. It has therefore,
137 been argued that any finance initiative should revolve around the actors in the sector [19].
138 Therefore, the understanding of the financing of electronic waste must be looked at within the
139 context of these interest groups. In the view of [12], there are three main stakeholders who
140 could bear financial responsibility for end-of-life management of any kind of waste including
141 entire society, waste holders and producers. The ensuing sections discusses some traditional
142 finance models that have been suggested for Ghana

143

144 **2.1 EXISTING FINANCING MODELS**

145 Existing studies [20] and [12] on e-waste financing has concentrated on manufacturers
146 through the extended producer responsibility (EPR). What is missing is whether suppliers of
147 electronic inputs for the producers of EEE fall within the category of producers. [12] outlines
148 three proposed and existing financing schemes for some countries. The first model is
149 *consumer e-waste financing* (CEF) approach. This is the model in California and Japan. In
150 California, consumers pay for the management of e-waste upon purchase of new electronic
151 and electrical appliance. In the case of Japan, consumers pay for disposing the electronic
152 equipment. This strategy as [21] suggests, provides an up-front finance for the management
153 of e-waste. However, it may lead to illegal dumping by consumers who want to avoid the
154 payment of fees.

155

156 The second is the *producer e-waste financing* (PEF). The countries using this approach (also
157 known as extended producer responsibility) include South Africa, Kenya, India and Europe.
158 In South Africa, the plan is to get producers pay into a fund to be disbursed to producer
159 responsibility organization. Kenya proposes a model where, producers pay for the net
160 treatment costs directly to recyclers.

161

162 The European model deviates slightly from other practices of EPR. The European model as
163 deduced from the work by [21], focuses on getting producers to invest more in product design
164 and re-manufacturing as well as financing the establishment of new industry in the collection,
165 dismantling and processing of e-waste. The next approach is the *shared e-waste financing*
166 (SEF) model. The SEF as proposed for Ethiopia is a combination of EPR with electricity bill
167 (or municipal solid waste fee) increase. Meanwhile, the method is described as a fair

168 allocation of financial responsibilities among two different stakeholders – manufacturers and
169 society.

170

171 The issues with the existing models is that they appear to be mitigating measures than to raise
172 funding to take advantage of the opportunity the sector presents. E-waste is touted a valuable
173 income stream [22]. A report by the [23] estimated Americans dump phones containing over
174 US\$60 million in gold/silver every year. According to the report, for every 1 million cell
175 phones that are recycled, 35,274 lbs of copper, 772 lbs of silver, 75lbs of gold and 33lbs of
176 palladium can be recovered. Although there is no consensus on the annual total value of
177 global e-waste trade, findings from various empirical studies show the sector is profitable if
178 properly exploit. For instance, [24] estimated the intrinsic material value of global e-waste to
179 be 48 billion euros in 2014. According [25], in 2009, the e-waste trade (primarily the black
180 market) was estimated to be US\$11 billion. The study concludes the industry remains
181 profitable based on its current exploitation of developing nations. Furthermore, [26] submits
182 that individual European companies involved in the e-waste black market make more than €2
183 million per year. As indicated earlier, WEEE contributes to between US\$105 million to
184 US\$268 million into Ghana's economy despite the crude technology used in its processing.

185

186 Furthermore, it is estimates that 600 forty feet super containers of WEEE are shipped to
187 Accra, Ghana on a monthly basis [27] [28]. In less than two years, majority of this WEEE
188 finds, their way into landfill sites, rivers and gutters since the people and the small businesses
189 involved in the e-waste trade has not the expertise, finance to acquire the needed technology
190 to process the waste into resource. Given the volume of WEEE that is generated annually in
191 Ghana, the question is if the above options for financing is adequate. It has been suggested
192 that with the right technology and investment, it could contribute significantly to the
193 economy. The paper provides some financing options for the processing of e-waste into
194 resource or other useful products.

195

196 **2.2 GHANA'S PROPOSED E-WASTE FINANCING MODEL**

197 Ghana's E-Waste law that was passed in 2016 largely makes producers responsible for the
198 management of waste in the country. This is similar to legislations in South Africa and
199 Kenya, where there is extensive producer responsibility in the payment for the cost of
200 managing e-waste. Under the new E-Waste Law of Ghana, it required of manufacturers and
201 importers of electronics, excluding state agencies, to register with the Environmental

202 Protection Agency and to pay levies that would go into a fund for the collection, treatment,
203 recovery and environmentally-sound disposal of electronic waste [29]. Similar to some
204 existing models like the Educational Trust Fund, Ghana Road Fund, National Health
205 Insurance Scheme, the question is how such a fund must be managed. Should an institution
206 from the public or the private sector be responsible for managing such a fund or the private
207 sector?

208 In this model, financial responsibility is allocated to producers but the organizational role
209 remains with the government. However, whether this works depends on the location of the
210 producers. The sector is largely dominated by the informal sector, operating unregistered
211 businesses. According to [30] 40 to 60 per cent of domestically generated e-waste is recycled,
212 out of which 95 per cent is done informally. Meanwhile, [31] maintain that replacing the
213 informal sector with a formal one is impractical. Therefore, any legislation and financial
214 strategy should aim at the informal sector. This is another challenge for the proposed
215 financing model for the sector.

216

217 The next point is how to tackle the issue of donation of electronics and electrical equipment,
218 especially computers that are given as gifts to institutions and schools. The question is who
219 pays for the taxes to be imposed on such EEE as being proposed by the new WEEE law. How
220 can these donating institutions ensure the functionality of these equipment before giving them
221 out? The country, like any other developing nation, depends on donations. There is evidence
222 that e-waste is sent to Africa and Ghana in the name of donation [32] [29]. The volumes of e-
223 waste in Ghana continues to increase. Two reasons account for this. First is the rapid growth
224 in global volumes of e-waste generated. In 2014, 41 million tonnes of e-waste estimated at
225 GB£34m were discarded world-wide [33] [34]. However, only 6million tonnes out of the
226 huge volumes of e-waste was recycled. The greater percentage of the unprocessed e-waste
227 eventually find their way to Africa and Ghana. [29] reports that 20 to 50 million tons of e-waste
228 are generated in the world annually and a great amount of that ends up in developing countries
229 including Ghana and Nigeria. Second reason accounting for the increase in e-waste is the
230 positive impact of the National ICT introduced in Ghana in 2012. The aim of the programme
231 was to increase the use and penetration of ICT in both social and economic activities in the
232 country. This had led to increase usage of ICT in education and governance. Ghana now
233 generates a substantial e-waste domestically. So the question is how the proposed financing
234 model sustains the management of the ever-increasing e-waste in the country.

235

236 Furthermore, it is difficult to control or manage the situation where importers pass on the
237 additional cost (by way of levies or taxes on EEE imports) to consumers. The idea of levying
238 dealers of EEE as a way to raise funding for the proposed e-waste fund is the possible price
239 pressure on consumers. Economic theory argues that producers would shift the effect of tax
240 on prices to consumers, especially where the product is one of a necessity product [35] [36].
241 The effect, if not carefully, analysed would be to discourage the patronage and use of EEE.
242 This certainly would negatively impact on the ICT4U programme of the country.

243

244 Further question that needs to be answered is whether revenues generated from levying
245 dealers of EEE is adequate for dealing with the e-waste menace now and for the future. A
246 recent survey by the UNOPS showed that between 2010 and 2014, 15,481,721 metric tons of
247 new EEE were imported into the country. A total of 595,328 tons of old EEE were imported
248 during the same period [37].

249 The current approach to funding e-waste suggests e-waste is still considered as just waste and
250 not resources. However, as discussed earlier, WEEE has the potential of generating wealth
251 and jobs for a country if given the necessary attention and investment. It is on this note that
252 we proposed more sustainable model for financing e-waste in Ghana.

253

254 **3.0 RESEARCH APPROACH**

255 The paper adopts documentary content analysis [38] approach to research. This is found to be
256 rigorous for the exploration of important but difficult-to-study issues of interest [39]. The
257 approach of the paper is to make replicable and valid inferences by interpreting textual
258 material. Primary data was used and sourced mainly from printed publications including
259 books, magazines, newspapers, websites, public records, media reports, private papers,
260 strategies, and policies, action plans by public bodies or organisations.

261

262 The research approach involved analytic reading and review of relevant written materials.
263 Then, the relevant portions that were in line with the study objective were then extracted.
264 There were three stages in the approach to this analysis. First is *preparation*. This is the stage
265 where the materials required for the analysis was identified and collected. This involved
266 identifying the possible source of the necessary data. This is followed by *material review and*
267 *sorting*. In this stage, the documents collected were studied in details and categorised with
268 reference to the study objectives. The final stage was the deductions and thematic write-up
269 stage. In this stage, deductions were made from a detailed study of the documents collected,

270 making inferences and drawing conclusions based on the views, opinions and findings from
271 previous studies. Results from the analysis were presented thematically; proposing a
272 financing alternative for the management of e-waste in Ghana.

273

274 **4.0 THE PROPOSED FINANCING MODELS**

275 There is evidence to support the view that the state cannot solely on a national fund to
276 support waste management in the country [40]. Private Sector Participation (PPP) can help
277 mobilize resources, reduce risks, contribute to economies of scale and enhance service delivery
278 [41] [42]. However, a PPP model would operate better if there is national framework for e-waste
279 would incorporate a business sense or describe returns on investment for private investors in the
280 sector. The paper, therefore, proposes the following models for financing e-waste in Ghana
281 including the state or the national fund:

282

283 ***4.1.1 Domestic/FDI in waste Processing***

284 The sector requires the inflow of investment like any other sectors of the economy.
285 Investments can come from both domestic and foreign direct investment. There are currently
286 no statistics on the total investment required for the management of the current electronic
287 waste in Ghana. But the statistics on the import of EEE into the country [37] suggest more
288 funding is required in dealing with the end-of-life of these electronics and electrical devices.
289 Furthermore, WEEE provides business opportunity with good returns. A 2015 United
290 Nations report, cited in [21] projected the global WEEE production to 50 million metric tons
291 by 2018, from the approximated 41.8 million metric tons in 2014. Global e-waste recovery
292 market holds enormous revenue potential and is expected to reach \$21 billion by 2020,
293 growing from \$6.9 billion in 2009. [43], [24] found the revenue generated from the e-waste
294 management market is expected to grow from \$9.15 billion in 2011 to \$20.25 billion in
295 2016 at a compound annual growth rate of 17.22% from 2011 to 2016. The implication is that
296 the sector provides business opportunity for investors.

297

298 ***4.1.2 Public Private Partnership***

299 Public private partnership has been used to finance numerous and similar projects in Ghana.
300 According to [44], PPP introduce private sector resources and/or expertise in order to help
301 provide and deliver public sector assets and services. These include the Ghana Community
302 Services Network Ltd (GCNet), solid and urban waste management [45] [46], urban and

303 small-town water provision [47]. Public private partnership would help pool funds and skills
304 from the two sectors for the funding of the e-waste activities.

305

306 ***4.1.3 Private Private Partnership***

307 This takes the form of joint ventures, mergers and strategic alliance. Due to the huge
308 investment required to finance e-waste business, it requires the pooling of resources. Private-
309 private partnership and strategic alliance is not common practice in Ghana and Africa.
310 However, if properly explored, it would raise the needed capital for the establishment of e-
311 waste business. In Ghana, mergers as a mode of raising capital has been found in the banking
312 sector, especially from the period between 2009 and 2014, when the Bank of Ghana increased
313 the minimum capital requirement from GHS60M to GHS120M. There is the need for the
314 small and medium sized waste management firms currently operating in the sector to go into
315 strategic alliance and joint ventures to enable them raise the needed capital for the taking
316 advantage of the opportunities in the sector. Beside two private local companies going into
317 alliance, domestic waste management companies can also go into alliance with foreign
318 private companies with the technology to process WEEE in the country.

319

320 ***4.1.4 Public Public partnership***

321 Public-public partnership mode of financing could be in the form of grants and donation (i.e.
322 technology or capital) to deal with WEEE in the country. The state receives numerous grants
323 and donations for undertaking numerous projects including poverty reduction, malaria
324 prevention and reducing HIV/AIDS prevalence. Such grants could be extended to e-waste
325 sector to enable the state raise the needed funding for the management of such harmful waste.
326 For instance, the German Federal Ministry for Economic Cooperation and Development
327 (BMZ), has partnered and sponsored similar projects in Ghana including Sustainable
328 Economic Development in Ghana as well as projects such as sustainable access to modern
329 energy services. There is even multiple project funding for Ghana by GIZ and the
330 Netherlands Directorate General for International Cooperation (DGIS) and the Danish
331 International Development Agency (DANIDA).

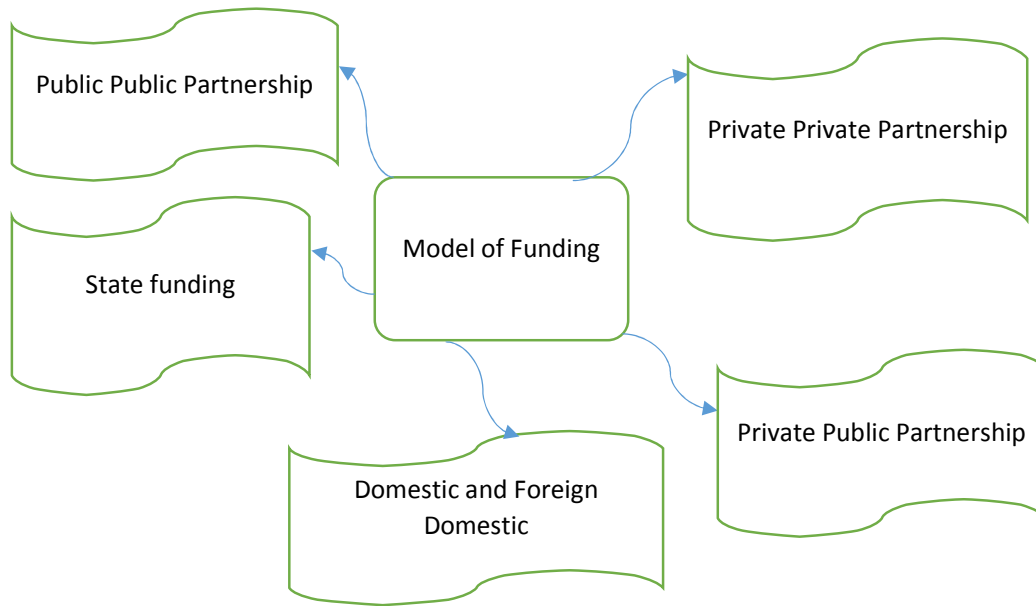
332

333 ***4.1.5 State Funding of E-waste Projects***

334 The business of electronic waste is largely dominated by the informal sector. As indicated
335 earlier, government funded e-waste project would help create jobs and at the same time

336 reduce the negative environmental impact of e-waste. As a means of funding, government
 337 can raise the needed capital by taxing second-hand EEE imported into the country. The state
 338 can issue bonds to finance e-waste. Funds from taxes on EEE and from issuing securities can
 339 be used to set up a waste management fund. This fund should be made accessible for
 340 MSMEs to enable them acquire the needed capital required for operating a business in the
 341 sector. This deviates from some existing models from other countries that use strategies such
 342 as consumer levying for buying EEE or dumping it. The aim of public or state funding has
 343 been purely on non-profit making motive.

344 **Figure 1: Alternative Source of Funding E-waste in Ghana**



345
 346
 347
 348
 349

5.0 CONCLUSIONS AND POLICY RECOMMENDATION

350 The waste from electronic and electrical equipment creates both problems and opportunities
 351 for individuals (investors), corporate bodies and the state. The problem of e-waste is not only
 352 created by the influx of WEEE from the developed countries, but e-waste is also generated
 353 domestically. This is contrary to the existing view that the WEEE problem is created by
 354 waste from developed countries.

355 Electronic waste is a resource than just a waste. However, the current approach to managing
 356 e-waste is short of business sense that enables the sector to attract the needed investment.

357 The sector is the source of job creation and income generation for most people in the informal
 358 sector. However, there is little by way of technological adoption due to limited investment in
 359 the sector.

360 The current WEEE funding strategy is more of raising money to mitigate the environmental
361 and health hazards that comes with WEEE.

362 The current and the proposed approach to funding e-waste have the tendency to impact
363 negatively on the national ICT4U policy. The policy aims at improving the adoption and
364 usage of ICT in the country.

365 **5.1 Policy recommendation**

366 Develop a national framework for supporting the establishment of eco-innovative MSMES in
367 the e-waste sector. Such framework should identify the sources of financing such businesses,
368 and these financing sources should include private, public or both sources. Both domestic and
369 foreign sources of funding would be critical in financing e-waste activities in the country.

370

371 The strategy of imposing taxes on EEE to raise funds for e-waste activities would have a
372 negative impact on the ICT4U policy of the country. The alternative source of funding other
373 than taxation would help in the attachment of the national ICT programme goals. Meanwhile,
374 in imposing taxes on the e-waste business, policymakers should be conscious of the attitude
375 of the informal sector towards the payment of taxes. There is the tendency for the operators
376 of these small businesses to go ‘undercover’ if they feel threatened by the effect of taxes on
377 their businesses.

378

379 There is the need to promote e-waste as a business venture and encourage the participation of
380 larger businesses. Such larger businesses are likely to put more investment into such activities
381 and acquire more or higher technology.

382

383 E-waste business operators can mobilize more resources and introduce superior technology to
384 managing WEEE to help them expand their businesses to enable them employ more people.

385

386 One of the key success factors for improved e-waste business, is the willingness of consumers
387 and their associations to patronise and pay more for environmentally friendly products.
388 Furthermore, middlemen/distributors and companies must through their CSR activities extend
389 their responsibility to distribution, consumption and disposal.

390

391

392 **6.0 REFERENCES**

- 393 1. Ghana ICT for Accelerated Development. (2003). Retrieved from
394 http://www.eldis.org/go/home&id=64012&type=Document#.WGoFZTMRd_0.
- 395 2. Alliance for Affordable Internet (2014 November 20). Ghana drops import tax on
396 smartphones following advocacy by A4AI-Ghana Coalition. Retrieved from
397 [http://a4ai.org/ghana-drops-import-tax-on-smartphones-following-advocacy-by-a4ai-](http://a4ai.org/ghana-drops-import-tax-on-smartphones-following-advocacy-by-a4ai-ghana-coalition/)
398 [ghana-coalition/](http://a4ai.org/ghana-drops-import-tax-on-smartphones-following-advocacy-by-a4ai-ghana-coalition/)
- 399 3. Ministry of Finance (2015). Budget statement and economic policy of the Republic of
400 Ghana for the 2015 financial year. Available at [http://www.mofep.gov.gh/budget-](http://www.mofep.gov.gh/budget-statements)
401 [statements](http://www.mofep.gov.gh/budget-statements).
- 402 4. Amoyaw-Osei, Y., Agyekum, O. O., Pwamang, J. A., Mueller, E., Fasko, R., &
403 Schlupe, M. (2011). Ghana e-waste country assessment. SBC e-waste Africa project,
404 2011111.
- 405 5. SBC, (2012). Ghana e-Waste Country Assessment: Secretariat of the Basel Convention
406 (SBC) e-Waste Africa Project Report.
- 407 6. Asante, K.A., Agusa, T., Biney, C.A., Agyekum, W.A., Bello, M., Otsuka, M., &
408 Tanabe, S. (2012). Multi-trace element levels and arsenic speciation in urine of e-
409 waste recycling workers from Agbogbloshie, Accra in Ghana. *Science of the Total*
410 *Environment*, 424: 63–73.
- 411 7. Eguchi, K. Nomiya, G. Devanathan, A. Subramanian, K.A. Bulbule, P.
412 Parthasarathy, S. Takahashi, S. Tanabe (2012). Different profiles of anthropogenic
413 and naturally produced organohalogen compounds in serum from residents living near
414 a coastal area and e-waste recycling workers in India. *Environment International*, 47:
415 8–16
- 416 8. Wang, T., Fu, J., Wang, Y., Liao, C., Tao, Y., & Jiang, G. (2009b). Use of scalp hair
417 as indicator of human exposure to heavy metals in an electronic waste recycling area.
418 *Environmental Pollution*, 157, pp. 2445–2451
- 419 9. Xing, G. H., Chan, J. K.Y., Leung, A. O. W., Wu, S.C., & Wong, M. H. (2009).
420 Environmental impact and human exposure to PCBs in Guiyu, an electronic waste
421 recycling site in China, *Environment International*, 35 pp. 76–82
- 422 10. Prakash, S., Manhart, A., Amoyaw-Osei, Y., and Agyekum, O. (2010). Socio-
423 economic assessment and feasibility study on sustainable e-waste management in
424 Accra, Ghana. <http://www.oeko.de/oekodoc/1057/2010-105-en.pdf>.

- 425 11. Amoyaw-Osei, Y., Agyekum, O., Pwamang, J., Mueller, E., Fasko, R., and Schluep,
426 M. (2011). Ghana e-waste country assessment, SBC e-waste Africa Project, Accra,
427 Ghana.
- 428 12. Magalini, F (2005). Financing Models for Sound E-Waste Management in Ethiopia.
429 Report commissioned by UNIDO in the project “E-Waste Management in Ethiopia
430 funded by the GEF. Retrieved from <https://www.unido.org/filead>
- 431 13. Lindhqvist, T., (2000). Extended Producer Responsibility in Cleaner Production. The
432 International Institute for Industrial Environmental Economics. Lund University,
433 Lund, Sweden.
- 434 14. Organisation for Economic Co-operation and Development. (2001). Retrieved from
435 <http://www.oecd.org/site/worldforum/33703867.pdf&sa>.
- 436 15. Khetriwal, D. S., Kraeuchi, P., & Widmer, R. (2007). Producer responsibility for e-
437 waste management: key issues for consideration-learning from the Swiss experience.
438 *Journal of Environmental Management*, 90(1): 153-165.
- 439 16. Sachs, N. (2006). Planning the Funeral at the Birth: Extended Producer Responsibility
440 in the European Union and the United States, 30 Harv. Envtl. L. Rev. 51
- 441 17. Herdiana, D. S., Pratikto, Sudjito, S. and Fuad, A. (2014). Alternative model extended
442 producer responsibility waste products of fish canning industry the concept of green
443 manufacturing and corporate social responsibility. *International Food Research*
444 *Journal*, 21(4), 1433-1439.
- 445 18. Wagner, M. (2015). The link of environmental and economic performance: Drivers
446 and limitations of sustainability integration. *J. Bus. Res.*, 68, 1306–1317
- 447 19. Kunz, N., Atasu, A., Mayers, K., & Van Wassenhove, L. (2014). Extended Producer
448 Responsibility: Stakeholder Concerns and Future Developments. *White Paper*,
449 *INSEAD Social Innovation Centre, Fontainebleau*.
- 450 20. Namias, J. (2013). The Future of Electronic Waste Recycling in The United States:
451 Obstacles and Domestic Solutions. Columbia University: Earth Engineering Center
- 452 21. Farrell, D. M. (2011). Electoral systems: a comparative introduction. Palgrave
453 Macmillan.
- 454 22. Smith, C. S. (2015). The Economics of E-Waste and the Cost to the Environment.
455 *Natural Resources & Environment*. 30(2).
- 456 23. SGS Group (2014). Self-Funding E-Waste Solutions: SGS Group Management SA

- 457 24. Balde, C.P., Wang, F., Kuehr, R., Huisman, J., (2014). The Global E-waste Monitor
458 2014, Quantities, Flows and Resources, United Nations University Institute for the
459 Advanced Study of Sustainability (UNU-IAS). Scycle, Bonn, Germany.
- 460 25. McIntire, E. (2015) "The International Tribunal for E-waste: Ending the Race
461 Towards Lethal Fallout," *Seattle Journal of Environmental Law*: 5(1):75-108.
- 462 26. Jefford, K. (2011 May 8). Trade in trash to Africa: Electrical equipment that needs
463 recycling ends up in Third World. The Sunday Times.
- 464 27. Macedo, J. (2015). E-Waste in Ghana: From Local Opportunities to Environmental
465 Mayhem March. Retrieved from, [https://www.linkedin.com/pulse/e-waste-ghana-
466 blessings-strings-attached-jenkins-macedo](https://www.linkedin.com/pulse/e-waste-ghana-blessings-strings-attached-jenkins-macedo)
- 467 28. Frandsen, M., Rasmussen, J. & Swart, M. (2011). What is a Waste? How your
468 Computer Causes Health Problems in Ghana. Copenhagen, Denmark: Dan Watch.
- 469 29. Dogbev, E. K. (2016). Ghana to set up e-waste recycling plant. Creative Imaginations
470 Publicity. Retrieved from [https://www.ghanabusinessnews.com/2016/10/17/ghana-to-
471 set-up-e-waste-recycling-plant/](https://www.ghanabusinessnews.com/2016/10/17/ghana-to-set-up-e-waste-recycling-plant/)
- 472 30. Oteng-Ababio, M. (2010). E-waste: an emerging challenge to solid waste
473 management in Ghana. *International Development Planning Review*, 32(2), 191-206.
- 474 31. Oteng-Ababio, M., & Amankwa, E. F. (2014). The e-waste conundrum: Balancing
475 evidence from the North and on-the-ground developing countries' realities for
476 improved management. *African Review of Economics and Finance*. 6(1), pp. 181–204
- 477 32. Vitola, G. (2011). Electronic Waste Hell. Retrieved from
478 <http://www.sbs.com.au/news/dateline/story/e-waste-hell>
- 479 33. Owusu, S. A. (2016 March 23). High tech toxic waste killing the poor in Ghana
480 Feature Article. Retrieved from
481 [http://www.ghanaweb.com/GhanaHomePage/features/High-tech-toxic-waste-killing-
482 the-poor-in-Ghana-425347](http://www.ghanaweb.com/GhanaHomePage/features/High-tech-toxic-waste-killing-the-poor-in-Ghana-425347).
- 483 34. United Nations University, (2014). Retrieved from [https://unu.edu/news/news/ewaste-
484 2014-unu-report.html](https://unu.edu/news/news/ewaste-2014-unu-report.html).
- 485 35. Entin, S. J. (2004). Tax Incidence, Tax Burden, and Tax Shifting: Who Really Pays
486 the Tax? *Institute for Research on the Economics of Taxation*. IRET Policy Bulletin
487 (88).
- 488 36. Abuselidze, G. (2012) The Influence of Optimal Tax Burden on Economic Activity
489 and Production Capacity: *Intelektine Ekonomika*, 6(4), p. 493–503

- 490 37. United Nations Office for Project Services. (2016). Retrieved from
491 <https://www.unops.org/english/Pages/Home.aspx>.
- 492 38. Hsieh, H. F., & Shannon, S. E. (2005). Three Approaches to Qualitative Content
493 Analysis, *Qualitative Health Research*, 15(9).
- 494 39. Duriau, V. J., Reger, R. K., & Pfarrer, M. D. (2007). A Content Analysis of the
495 Content Analysis Literature in Organization Studies: Research Themes, Data Sources,
496 and Methodological Refinements. *Organization Research Methods*, 10(1), 5–34
- 497 40. Dinye, R. D. (2006). Economies of Private Sector Participation in Solid Waste
498 Management in Takoradi - A Ghanaian City. *Journal of Science and Technology*.
499 26(1), pp 60-75
- 500 41. Baud, I. S. A. (2001). Local Governance and Partnership: Implications for an Urban
501 Habitat. CERES Summer School, University of Wageningen.
- 502 42. Helmsing, A. H. J. (2000). Decentralization and Enablement, Issues in the Local
503 Government Debate. Inaugural Address, Utrecht University.
- 504 43. Mohanty, C. R. C. (2012). E-waste management in Asia: Challenges and
505 Opportunities-Human health and resource efficiency perspectives; Greater Mekong
506 Sub-region (GMS) training workshop on building capacity to deal with the illegal
507 shipments of e-waste and near-end-of-life electronics Ha Noi. Viet Nam.
- 508 44. Hagan, T. (2009). Ghana: Funding Infrastructure by Public-Private Partnerships (PPP)
509 The Project Company (Ghana) Ltd. Retrieved from
510 [http://www.slideshare.net/tonyhagan/ghana-funding-infrastructure-by-publicprivate-](http://www.slideshare.net/tonyhagan/ghana-funding-infrastructure-by-publicprivate-partnerships-ppp)
511 [partnerships-ppp](http://www.slideshare.net/tonyhagan/ghana-funding-infrastructure-by-publicprivate-partnerships-ppp).
- 512 45. Amoah, S. T. & Kosoe, E. A. (2014). Solid Waste Management in Urban Areas of
513 Ghana: Issues and Experiences from Wa. *Journal of Environment Pollution and*
514 *Human Health*. Retrieved from 2(5) 110-117. Available at
515 <http://pubs.sciepub.com/jephh/2/5/3>. DOI:10.12691/jephh-2-5-3
- 516 46. Asare, B. E. & Frimpong, M. K. (2013). Public-private partnerships and urban
517 sanitation: Do expectations meet realities in Madina -Ghana? *Journal of African*
518 *Studies and Development*. 5(5), pp. 113-124
- 519 47. Chan, A. P. C. & Ameyaw, E. E. (2013). The private sector's involvement in the water
520 industry of Ghana", *Journal of Engineering, Design and Technology*. 11(3), pp.251 –
521 275
- 522 48. Behring, N (2007). Inside the Digital Dump, 160 *Foreign Policy* 74

- 523 49. Ankrah, G. (2016 November 21). Parliament passes law to Control Hazardous & E-
524 Waste. Information Services Department of Government of Ghana. Retrieved from
525 [http://www.ghana.gov.gh/index.php/media-center/news/2915-parliament-passes-law-](http://www.ghana.gov.gh/index.php/media-center/news/2915-parliament-passes-law-to-control-hazardous-e-waste)
526 [to-control-hazardous-e-waste.](http://www.ghana.gov.gh/index.php/media-center/news/2915-parliament-passes-law-to-control-hazardous-e-waste)