



Executive Summary

E-waste is one of the fastest growing waste streams in the world. In developed countries, it equals 1% of total solid waste generation on an average. In this context, Ministry of Environment & Forest, Government of India at first notified E-waste guidelines followed by Hazardous Waste (Management, Handling & Transboundary) Rules in 2008. This was followed by formulation of E-waste (Management & Handling) Rules 2011, which came into effect from 1st May 2012. In order to implement these regulations, each state mandated to prepare their E-waste inventory which can assist State Pollution Control Boards (SPCB) to monitor & regulate E-waste Management as per E-waste rules. Each of the State Pollution Control Board's have been assigned the responsibility for inventorization of E-waste in their State, grant and renewal of authorization, registration of recyclers, monitoring of compliances of authorization and registration conditions and action against violation of these rules. In view of the dues and responsibility defined under the E-waste rule, 2011, Madhya Pradesh Pollution Control Board (MPPCB) has planned for inventorization of E-waste in the **four divisions in 1st Phase and six divisions in 2nd phase** for the State of Madhya Pradesh. IRG Systems South Asia Pvt. Ltd. has been assigned the task to carryout the inventorization in ten divisions of Madhya Pradesh. The current effort will assist to prepare an inventory of E-waste generated in the state so that an action plan can be formulated for future interventions.

The objective of the E-waste Assessment is to identify and quantify the E-waste generation for reuse, recycle and final disposal in the study area by adopting uniform approach and methodology. SoW as per ToR includes assessment of E-waste generation, present handling practices, storage, and channelization for its recycling or disposal, by producers, consumer, or bulk consumers. The report shall also include the detail list of producers, consumer or bulk consumers, collection centers, dismantlers and recyclers with the name, address contact no. and their practices for E-waste handling & management. Finally, the inventorization of E-waste shall be done for different categories (Information Technology and Telecommunication and consumer / household appliances) listed in schedule – 1 of E-waste Rules 2012. The study area includes Bhopal, Gwalior, Indore, Jabalpur, Chambal, Narmadapuram, Rewa, Sagar, Shahdol and Ujjain divisions of the state of Madhya Pradesh.

This final report has been compiled division-wise in six chapters. This report is being compiled giving inventory of various stakeholders and present handling practices, storages & channelization for recycling.

Some of the major features of E-waste regulation having implication on E-waste inventory assessment indicate that no target has been fixed to collect E-waste from the time of enforcement. Producer is not bound by any collection target. There are no mandatory provisions for producers in the rules to declare quantity of EEE placed in the market since 2012. No mechanism for tracking purchase of EEE by bulk consumers exists.



Therefore, monitoring of E-waste inventory through evaluation of Form 2 or Form 3 in accordance with Rule 4(9) of E-waste Rule by MPPCB in the state is possible only through the producers data obtained from centralized agency e.g. CPCB or the state where these producers are registered after 2012. CPCB data shows that as of September 2013. Therefore, MPPCB can track & monitor E-waste inventory in the state through the dismantler's / recycler's data obtained from centralized agency e.g. CPCB or the state where dismantler's / recycler's are registered. This also indicates that E-waste is either dismantled or recycled in informal sector in the state. Producers are majorly responsible for all the activities including financing of E-waste management. It indicates that producers may be fulfilling their responsibility through collection system catering to dismantlers & recycler within and outside the state. Therefore, collection centres registered in the state may offer a limited opportunity of E-waste inventory tracking & monitoring mechanism in the state. Assessment on the upstream side of the E-waste chain especially of both types of consumers (bulk & individual consumer), also indicate that only bulk consumer offer opportunity of E-waste inventory tracking & monitoring. Though, bulk consumers are required to maintain records of E-waste, they are not required to file the returns. Since no mechanism exist for tracking purchase of EEE by bulk consumers and producers are not required to declare quantity of EEE placed in the market since 2012, E-waste inventory assessment has to rely on available historical market research data. Therefore, there is need to identify different producers, profile of consumers & bulk consumers, collection centre, dismantlers & recyclers who are catering to E-waste in the state.

Tracer technique, which was pilot tested in Madhya Pradesh has been used in major urban centers/towns in Madhya Pradesh to fix E-waste trade value chain. A tentative E-waste trade value chain for study area which has emerged out of field work from tracer techniques indicates the following profile of stakeholders & their inventory.

Producers: EEE producers / manufacturers do not exist in the study area. However, their products are being sold in these divisions. Secondary data confirms that EEE producers do not have manufacturing facilities in these divisions and therefore they are not registered with MP Pollution Control Board. Since these producers are responsible for their products under EPR, their detailed **inventory** as per schedule 1 of E-waste (Management & Handling) rules are given in **Annexure 1**.

Distributors / Traders / Retailers: EEE from these producers are sold in the study area through Distributor / Trader / Retail network as well as directly through the company. Items like Centralized Data Processing, Mainframes, Minicomputers of Schedule 1 are used by large corporates, State and Central Government agencies falling under the category of bulk consumers whose profile is given below. **Inventory** of Distributors / Traders / Retailers selling items other than mentioned above in the study area are covered. However, retailers / dealers do not fall under the purview of E-waste (Management & Handling) Rules 2011, unless they serve as collection centre or drop off point.



Consumers: There are two types of consumers, which are found in the ten divisions of study area. Individual Consumers & Bulk Consumers. **Inventory** of bulk consumers also covered.

Collection Centres / Channel: Tracer analysis indicates that EEE, which becomes E-waste in the study area partly gets collected & transported in the informal sector and partly in formal sector. Primary survey carried out through Tracer technique indicates that bulk of E-waste generated in the study area goes to informal sector. Majority of the producer / manufacturer have established collection channel in the study area. These collection channels work through following mechanism.

1. Single point call centre
2. Distributors / Retailers
3. Service Centres
4. Physically established collection centre / drop off point

The producers use a combination of these mechanisms. Inventory of Service centres in the study area and inventory of Physically established collection centres are also covered. Majority of producers use call centre as well as dealer's network for collection of E-waste. There are two possibilities of onward transportation & disposal of E-waste. The first possibility is the disposal through informal sector & the second is through registered recycler.

E-waste is collected & dismantled in informal sector in the study area. Further, its major fractions are transported outside the state mainly to Delhi through informal sector traders. An inventory location of major scrap vendor / dismantler, temporary stockpile site / informal collection centre & landfill site is described.

Small scrap dealer purchase waste from Household / Commercial Area / Institution, etc. At first stage, they segregate the waste than break the item and collect valuable items like Aluminum, Copper, Iron & Steel, Compressor, motor, etc. from E-waste. They sell their collected item to the large scrap dealer. They visit nearby area on daily/weekly basis and purchase the waste. These scrap dealers are not licensed by the municipalities but are part of the networks of large scrap dealers. Dismantling and segregation of E-waste occurs in a major way at large scrap dealers. Inventory of hotspots, identified in the study area have been geographically shown & also mapped. Some of the major findings of the disposal mechanism are:

- Electronic items goes to mechanic shops from households for repairing, and mechanic replace damaged / defunct parts/components from it and then they sold it to scrap dealers.
- Mechanics sell E-waste to scrap dealer by weight mainly of ICT items (IT as per Schedule 1) at Rs. 200-250 per kg
- Scrap vendors sold E-waste to scrap dealer by weight at Rs. 150-250 per kg



- Scrap vendors sold damage mobile phone to scrap dealer as individual piece at Rs. 20-25 per piece
- Scrap dealer comes from Delhi yearly twice/thrice usually at the time of Bishwakarma Puja and Diwali for collecting of E-waste
- CPCB data shows that as of September 2013, Madhya Pradesh has Hostech Eco Management Pvt. Ltd. & M/s Unique Echo Recycle has two E-waste dismantler / recycler, both located at Indore having a licensed capacity of 750 MTA & 6000 MTA. Therefore, this indicates that E-waste is either dismantled or recycled in both formal and informal sector in state because of their limited capacity. Further, there is no organized mechanism for collection, transportation and disposal of E-Waste in Bhopal, Gwalior, Indore, Jabalpur, Chambal, Narmadapuram, Rewa, Sagar, Shahdol and Ujjain divisions of Madhya Pradesh.
- No mechanism exists in the state to monitor and track its inventory, collection, transportation and disposal.

The entire amount of E-waste from these towns is transported to Delhi for dismantling and further supply to Delhi market. Photo documentation captured district-wise for the all the divisions of Bhopal, Gwalior, Indore, Jabalpur, Chambal, Narmadapuram, Rewa, Sagar, Shahdol and Ujjain divisions of Madhya Pradesh is also described.

Repair Shops (AC/WM/REF): One person repairs one of these items every day. E-waste fractions/ waste Parts, like plastic body of these items, etc. is dumped into community bin and valuable item sold to nearby scrap dealer. Some of the respondent informed that Item which is not in repairable condition is returned to the owner of the product who in turn sells to the scrap dealer. Majority of the product are in repairable condition.

Repair Shops (TV / PC / Mobile Phone): Majority of mobile phones, TV & computers repair shop owners are local citizens. Waste Parts, like plastic body of these items, etc. are dumped into community bin and valuable item sold to nearby scrap dealer. They also store valuable item and use it to repair other EEE. In case of mobile phone, they utilize maximum parts while waste parts are dumped in municipal bin. Majority of the product are in repairable condition.

The description of each of these methods and constraints & advantages of each of these methods discussed. The data requirement for each methodology based on mathematical expressions is also described. The extent of data required depends on the extent of geographical boundary, which could be national, regional or city boundary. Conceptually, the source of data can be identified by understanding the “material flow chain” within the given geographical boundary. A list of sources of data in study area, which was required for application of inventory assessment methodology . A sample of filled questionnaire using in field survey . Workshop presentation given in Bhopal, Gwalior, Indore and Jabalpur division of Madhya Pradesh. District wise and item wise breakup of EEE installed base for all the divisions for Air Conditioners, refrigerator, washing machine, personal computers, cellular telephones, TVs and other items as per schedule 1 market size is described. District wise and item wise E-waste



inventory projection for all the divisions in numbers and weights is discussed for Bhopal, Gwalior, Indore, Jabalpur, Chambal, Narmadapuram, Rewa, Sagar, Shahdol and Ujjain divisions of Madhya Pradesh starting from 2011 till 2020.

Data matrix versus methodology used for E-waste inventory assessment indicates “Market Supply” method and “Carnegie Mellon” method can be applied for WEEE / E-waste inventory assessment in Bhopal, Gwalior, Indore, Jabalpur, Chambal, Narmadapuram, Rewa, Sagar, Shahdol and Ujjain divisions of Madhya Pradesh. **However, a combination of Carnegie Mellon method & tracer tracking has been selected for inventory assessment since it covers all the aspects of material flow chain.** Assessment of data from these stakeholders through tracer tracking has resulted in assessment of obsolescence rate or average life of equipment described in chapter 5. Major sources of secondary data included Saturation Level – National census data was obtained from office of the Registrar General & Census Operation, Govt. of India, National Sample Survey Organization (NSSO), Department of Statistics, Government of India, State Statistics from Department of Statistics, Government of Madhya Pradesh, Telecom Regulatory Authority of India (TRAI), Ministry of Communications & Information Technology (MOCIT), Government of India, Industry Association like Manufacturers Association for Information Technology (MAIT), Electronic Industries Association of India (ELCINA), Telecom Equipment Manufacturers Association of India (TEMA) & Research Institutions e.g. National Council for Applied Economic Research (NCAER). Data related to average life time, storage data, reuse, recycling & disposal at landfill site was obtained through “tracer tracking” technique & primary survey.

In **Bhopal division** data analysis shows that cell phone have the highest installed base followed by Computers, TV, printers, fixed line telephone, refrigerators, washing machines and Air Conditioners. Bhopal has the highest installed base of all the items followed by Rajgarh & other districts of Bhopal division. In **Gwalior division** data analysis shows that cell phone have the highest installed base followed by Computers, TV, printers, fixed line telephone, refrigerators, washing machines and Air Conditioners. Gwalior has the highest installed base of all the items followed by Shivpuri, Ashoknagar, Guna, & Datia districts of Gwalior division in Madhya Pradesh. In **Indore division** data analysis shows that cell phone have the highest installed base followed by Computers, TV, printers, fixed line telephone, refrigerators, washing machines and Air Conditioners. Indore has the highest installed base of all the items followed by Dhar, Khargone, Barwani, Jhabua, Alirajpur, Khandwa & Burhanpur districts of Indore division. In **Jabalpur division** data analysis shows that cell phone have the highest installed base followed by Computers, TV, printers, fixed line telephone, refrigerators, washing machines and Air Conditioners. Jabalpur has the highest installed base of all the items followed by Balaghat, Chhindwara, Dindori, Katni, Mandla, Narsingpur, Seoni and Jabalpur districts of Jabalpur division. In **Chambal division** data analysis shows that cell phone have the highest installed base followed by Computers, TV, printers, fixed line telephone, refrigerators, washing machines and Air Conditioners. Morena has the highest installed base of all the items followed by Bhind and Sheopur districts of Chambal division. In **Narmadapuram (Hoshangabad) division** data analysis shows that cell phone have the highest installed base followed by Computers, TV, printers, fixed line



telephone, refrigerators, washing machines and Air Conditioners. Narmadapuram (Hoshangabad) has the highest installed base of all the items followed by Betul and Harda districts of Narmadapuram (Hoshangabad) division. In **Rewa division** data analysis shows that cell phone have the highest installed base followed by Computers, TV, printers, fixed line telephone, refrigerators, washing machines and Air Conditioners. Rewa has the highest installed base of all the items followed by Satna and Sidhi districts of Rewa division. In **Sagar division** data analysis shows that cell phone have the highest installed base followed by Computers, TV, printers, fixed line telephone, refrigerators, washing machines and Air Conditioners. Sagar has the highest installed base of all the items followed by Chhatarpur, Tikamgarh, Damoh and Panna districts of Sagar division. In **Shahdol division** data analysis shows that cell phone have the highest installed base followed by Computers, TV, printers, fixed line telephone, refrigerators, washing machines and Air Conditioners. Shahdol has the highest installed base of all the items followed by Anuppur, Umaria and Dindori districts of Shahdol division. In **Ujjain division** data analysis shows that cell phone have the highest installed base followed by Computers, TV, printers, fixed line telephone, refrigerators, washing machines and Air Conditioners. In Dewas cellular phone, fixed line phone, TV, washing machine and refrigerator has the highest installed base followed by Mandsaur, Neemuch, Ratlam, Shajapur, Ujjain and Agar-Malwa districts of Ujjain division. In Ujjain, computer and AC has the highest installed base followed by Dewas, Mandsaur, Ratlam, Neemuch, Shajapur and Agar-Malwa districts of Ujjain division.

Bhopal division inventory indicate that E-waste generation ranges from **17970.04 MT/Y in 2011 to 62928.76 MT/Y in 2020**. In 2013, E-waste in metric tons from TV (CRT/LCD/LED) constitutes 60% of the total inventory followed by refrigerator (23%), Washing machine (9%), Computer (3%), Cellular phone (2%), Air conditioner (2%), Fixed Line Phone (1%) & Printer (0%). In 2020, it is expected that E-waste from TV (CRT/LCD/LED) will constitute about 37% of the total inventory followed by Computer (31%), Refrigerator (16%), Washing machine (7%), Cellular phone (5%), Printer (3%), Air conditioner (1%) & Fixed Line Phone (0%). **Gwalior division** inventory division indicate that E-waste generation ranges from **15324.09 MT/Y in 2011 to 47668.31 MT/Y in 2020**. In 2013, E-waste in metric tons from TV (CRT/LCD/LED) constitutes 63% of the total inventory followed by refrigerator (21%), Washing machine (8%), Cellular phone (3%), Air conditioner (2%), Computer (2%), Fixed Line Phone (1%) & Printer (0%). In 2020, it is expected that E-waste from TV (CRT/LCD/LED) (43%), computer will constitute about 25% of the total inventory followed by Refrigerator (16%), Washing machine (7%), Cellular phone (5%), Printer (3%), Air conditioner (1%) & Fixed Line Phone (0%). **Indore division** inventory indicate that E-waste generation ranges from **31164.33 MT/Y in 2011 to 99031.42 MT/Y in 2020**. In 2013, E-waste in metric tons from TV (CRT/LCD/LED) constitutes 51% of the total inventory followed by Air conditioner (21%), refrigerator (14%), Washing machine (9%), Computer (2%), Cellular phone (2%), Fixed Line Phone (1%) & Printer (0%). In 2020, it is expected that E-waste from TV (CRT/LCD/LED) will constitute about 36% of the total inventory followed computer by (26%), Air conditioner (15%), Refrigerator (11%), Washing machine (7%), Cellular phone (4%), Printer (1%), & Fixed Line Phone (0%). **Jabalpur division** inventory



indicate that E-waste generation ranges from **30458.32 MT/Y in 2011 to 82646.08 MT/Y in 2020**. In 2013, E-waste in metric tons from TV (CRT/LCD/LED) constitutes 56% of the total inventory followed by Air conditioner (15%), refrigerator (15%), Washing machine (9%), Computer (2%), Cellular phone (2%), Fixed Line Phone (1%) & Printer (0%). In 2020, it is expected that E-waste from TV (CRT/LCD/LED) (40%) will constitute about of the total inventory followed by computer 23%, Air conditioner (12%), Refrigerator (12%), Washing machine (8%), Cellular phone (4%), Printer (1%), & Fixed Line Phone (0%). **Chambal division** inventory indicate that E-waste generation ranges from **7803.32 MT/Y in 2011 to 24270.56 MT/Y in 2020**. In 2013, E-waste in metric tons from TV (CRT/LCD/LED) constitutes 67 % of the total inventory followed by refrigerator (17 %), Washing machine (8 %), Cellular phone (3 %), Air conditioner (2 %), Computer (2 %), Fixed Line Phone (1 %) & Printer (0 %). In 2020, it is expected that E-waste from TV (CRT/LCD/LED) (48 %), computer will constitute about 23 % of the total inventory followed by Refrigerator (14 %), Washing machine (6 %), Cellular phone (6 %), Printer (2 %), Air conditioner (1 %) & Fixed Line Phone 0 %). **Narmadapuram (Hoshangabad) division** inventory indicate that E-waste generation ranges from **6648.37 MT/Y in 2011 to 19432.79 MT/Y in 2020**. In 2013, E-waste in metric tons from TV (CRT/LCD/LED) constitutes 66% of the total inventory followed by refrigerator (18%), Washing machine (9%), Cellular phone (2%), Air conditioner (2%), Computer (2%), Fixed Line Phone (1%) & Printer (0%). In 2020, it is expected that E-waste from TV (CRT/LCD/LED) (46%), computer will constitute about 24% of the total inventory followed by Refrigerator (15%), Washing machine (7%), Cellular phone (5%), Printer (2%), Air conditioner (1%) & Fixed Line Phone (0%). **Rewa division** inventory indicate that E-waste generation ranges from **9139.29 MT/Y in 2011 to 31462.79 MT/Y in 2020**. In 2013, E-waste in metric tons from TV (CRT/LCD/LED) constitutes 70% of the total inventory followed by refrigerator (16%), Washing machine (7%), Cellular phone (3%), Air conditioner (1%), Computer (2%), Fixed Line Phone (1%) & Printer (0%). In 2020, it is expected that E-waste from TV (CRT/LCD/LED) (45%), computer will constitute about 28% of the total inventory followed by Refrigerator (12%), Washing machine (5%), Cellular phone (6%), Printer (3%), Air conditioner (1%) & Fixed Line Phone (0%). **Sagar division** inventory indicate that E-waste generation ranges from **14426.62 MT/Y in 2011 to 43343.62 MT/Y in 2020**. In 2013, E-waste in metric tons from TV (CRT/LCD/LED) constitutes 66% of the total inventory followed by refrigerator (18%), Washing machine (8%), Cellular phone (3%), Air conditioner (2%), Computer (2%), Fixed Line Phone (1%) & Printer (0%). In 2020, it is expected that E-waste from TV (CRT/LCD/LED) (48%), computer will constitute about 22% of the total inventory followed by Refrigerator (14%), Washing machine (6%), Cellular phone (6%), Printer (3%), Air conditioner (1%) & Fixed Line Phone (0%). **Shahdol division** inventory indicate that E-waste generation ranges from **5426.88 MT/Y in 2011 to 16939.08 MT/Y in 2020**. In 2013, E-waste in metric tons from TV (CRT/LCD/LED) constitutes 68% of the total inventory followed by refrigerator (16%), Washing machine (8%), Cellular phone (3%), Air conditioner (2%), Computer (2%), Fixed Line Phone (1%) & Printer (0%). In 2020, it is expected that E-waste from TV (CRT/LCD/LED) (47%), computer will constitute about 25% of the total inventory followed by Refrigerator (13%), Cellular phone (6%), Washing machine (5%), Printer (3%),



Air conditioner (1%) & Fixed Line Phone (0%). **Ujjain division** inventory indicate that E-waste generation ranges from **20559.16 MT/Y in 2012 to 55551.88 MT/Y in 2020**. In 2013, E-waste in metric tons from TV (CRT/LCD/LED) constitutes 59% of the total inventory followed by refrigerator (14%), Washing machine (10%), Air conditioner (12%), Cellular phone (2%), , Computer (2%), Fixed Line Phone (1%) & Printer (0%). In 2020, it is expected that E-waste from TV (CRT/LCD/LED) (43%), computer will constitute about 23% of the total inventory followed by Refrigerator (12%), Air conditioner (9%), Washing machine (8%), Cellular phone (4%), Printer (1%) & Fixed Line Phone (0%).

In **Bhopal division** some major observations are Operating margin for Television waste per kilogram is Rs. 5.97, for waste refrigerator is Rs. 4.49 per kilogram, For that of Air Conditioners is Rs. 16.76 per kilogram, scrap old Personal Computer is Rs. 7.23 per kg and waste cellular phones is Rs. 29.44 per kg. The operating margin ranges from Rs. 4.49 to Rs. 29.44 per kilogram. Scrap of Mobile / cellular phones gives the maximum operating margin of Rs. 29.44 while scrap from refrigerators gives the minimum profit of Rs. 4.49 per day. In

Gwalior division some major observations are Operating margin for Television waste per kilogram is Rs. 0.44. Operating margin for waste refrigerator is Rs. 11.46 per kilogram. For that of Washing Machine is Rs. 13.03 per kilogram. For that of Air Conditioners is Rs. 18.40 per kilogram. For scrap old Personal Computer is Rs. 6.98 per kg. For waste cellular phones is Rs. 24.20 per kg. The operating margin ranges from Rs. 0.44 to Rs. 24.20 per kilogram. Scrap of Mobile / cellular phones gives the maximum operating margin of Rs. 24.20 while scrap from television gives the minimum profit of Rs. 0.44 per kilogram.

In **Indore division** some major observations are Operating margin for Television waste per kilogram is Rs. 5.48, for waste refrigerator is Rs. 2.52 per kilogram, For that of Air Conditioners is Rs. 13.45 per kilogram, For scrap old Personal Computer is Rs. 6.69 per kg and For waste cellular phones is Rs. 24.43 per kg, The operating margin ranges from Rs. 2.52 to Rs. 24.43 per kilogram. Scrap of Mobile / cellular phones gives the maximum operating margin of Rs. 24.43 while scrap from refrigerators gives the minimum profit of Rs. 2.52 per day.

In **Jabalpur division** some major observations are operating margin for Television waste per kilogram is Rs. 2.73. Operating margin for waste refrigerator is Rs. 14.99 per kilogram. For that of Washing Machine is Rs. 17.14 per kilogram. For that of Air Conditioners is Rs. 24.67 per kilogram. For scrap old Personal Computer is Rs. 14.28 per kg and for waste cellular phones is Rs. 27.66 per kg. The operating margin ranges from Rs. 2.73 to Rs. 27.66 per kilogram. Scrap of Mobile / cellular phones gives the maximum operating margin of Rs. 27.66 while scrap from television gives the minimum profit of Rs. 2.73 per kilogram. This indicates that informal sector if brought into formal sector considering taxation involved will only dismantle / recycle cellular phones followed by ACs and WMs to some extent. Therefore, there is a need to formulate financial instrument for making dismantling / recycling of white goods viable.



In **Chambal division** some major observations are Operating margin for Television waste per kilogram is Rs. 0.44. Operating margin for waste refrigerator is Rs. 11.46 per kilogram. For that of Washing Machine is Rs. 13.03 per kilogram. For that of Air Conditioners is Rs. 18.40 per kilogram. For scrap old Personal Computer is Rs. 6.98 per kg. For waste cellular phones is Rs. 24.20 per kg. The operating margin ranges from Rs. 0.44 to Rs. 24.20 per kilogram. Scrap of Mobile / cellular phones gives the maximum operating margin of Rs. 24.20 while scrap from television gives the minimum profit of Rs. 0.44 per kilogram. This indicates that informal sector if brought into formal sector considering taxation involved will only dismantle / recycle cellular phones followed by ACs and WMs to some extent. Therefore, there is a need to formulate financial instrument for making dismantling / recycling of white goods viable.

In **Narmadapuram (Hoshangabad) division** some major observations are Operating margin for Television waste per kilogram is Rs. 0.44. Operating margin for waste refrigerator is Rs. 11.46 per kilogram. For that of Washing Machine is Rs. 13.03 per kilogram. For that of Air Conditioners is Rs. 18.40 per kilogram. For scrap old Personal Computer is Rs. 6.98 per kg. For waste cellular phones is Rs. 24.20 per kg. The operating margin ranges from Rs. 0.44 to Rs. 24.20 per kilogram. Scrap of Mobile / cellular phones gives the maximum operating margin of Rs. 24.20 while scrap from television gives the minimum profit of Rs. 0.44 per kilogram. This indicates that informal sector if brought into formal sector considering taxation involved will only dismantle / recycle cellular phones followed by ACs and WMs to some extent. Therefore, there is a need to formulate financial instrument for making dismantling / recycling of white goods viable.

In **Rewa division** some major observations are Operating margin for Television waste per kilogram is Rs. 0.44. Operating margin for waste refrigerator is Rs. 11.46 per kilogram. For that of Washing Machine is Rs. 13.03 per kilogram. For that of Air Conditioners is Rs. 18.40 per kilogram. For scrap old Personal Computer is Rs. 6.98 per kg. For waste cellular phones is Rs. 24.20 per kg. The operating margin ranges from Rs. 0.44 to Rs. 24.20 per kilogram. Scrap of Mobile / cellular phones gives the maximum operating margin of Rs. 24.20 while scrap from television gives the minimum profit of Rs. 0.44 per kilogram. This indicates that informal sector if brought into formal sector considering taxation involved will only dismantle / recycle cellular phones followed by ACs and WMs to some extent. Therefore, there is a need to formulate financial instrument for making dismantling / recycling of white goods viable.

In **Sagar division** some major observations are Operating margin for Television waste per kilogram is Rs. 0.44. Operating margin for waste refrigerator is Rs. 11.46 per kilogram. For that of Washing Machine is Rs. 13.03 per kilogram. For that of Air Conditioners is Rs. 18.40 per kilogram. For scrap old Personal Computer is Rs. 6.98 per kg. For waste cellular phones is Rs. 24.20 per kg. The operating margin ranges from Rs. 0.44 to Rs. 24.20 per kilogram. Scrap of Mobile / cellular phones gives the maximum operating margin of Rs. 24.20 while scrap from television gives the minimum profit of Rs. 0.44 per kilogram. This indicates that informal sector if brought into formal sector considering taxation involved will only dismantle / recycle cellular phones followed by ACs and WMs to some



extent. Therefore, there is a need to formulate financial instrument for making dismantling / recycling of white goods viable.

In **Shahdol division** some major observations are Operating margin for Television waste per kilogram is Rs. 0.44. Operating margin for waste refrigerator is Rs. 11.46 per kilogram. For that of Washing Machine is Rs. 13.03 per kilogram. For that of Air Conditioners is Rs. 18.40 per kilogram. For scrap old Personal Computer is Rs. 6.98 per kg. For waste cellular phones is Rs. 24.20 per kg. The operating margin ranges from Rs. 0.44 to Rs. 24.20 per kilogram. Scrap of Mobile / cellular phones gives the maximum operating margin of Rs. 24.20 while scrap from television gives the minimum profit of Rs. 0.44 per kilogram. This indicates that informal sector if brought into formal sector considering taxation involved will only dismantle / recycle cellular phones followed by ACs and WMs to some extent. Therefore, there is a need to formulate financial instrument for making dismantling / recycling of white goods viable.

In **Ujjain division** some major observations are Operating margin for Television waste per kilogram is Rs. 0.44. Operating margin for waste refrigerator is Rs. 11.46 per kilogram. For that of Washing Machine is Rs. 13.03 per kilogram. For that of Air Conditioners is Rs. 18.40 per kilogram. For scrap old Personal Computer is Rs. 6.98 per kg. For waste cellular phones is Rs. 24.20 per kg. The operating margin ranges from Rs. 0.44 to Rs. 24.20 per kilogram. Scrap of Mobile / cellular phones gives the maximum operating margin of Rs. 24.20 while scrap from television gives the minimum profit of Rs. 0.44 per kilogram. This indicates that informal sector if brought into formal sector considering taxation involved will only dismantle / recycle cellular phones followed by ACs and WMs to some extent. Therefore, there is a need to formulate financial instrument for making dismantling / recycling of white goods viable.

Market risks matrix highlight the availability of raw material, its collection and transportation as risks of high & medium intensities. Collection mechanism directly impacts the availability of raw material. Therefore, there is a need for both strict implementation of regulations as well as financial instrument for diverting E-waste inventory in to the formal sector.