

IRG Systems South Asia Pvt. Ltd.



IRG Systems South Asia Pvt. Ltd.



”Mission ...

To help governments, the private sector, communities and households manage critical resources to build a cleaner, safer and more prosperous world.”

IRGSSA designs, implements, and manages programs in various sectors including:

E-Waste Management

Waste Management

Geoinformatics

Disaster Management

**Environment
&
Natural Resources**

Energy

**Environmental
Management**

Energy Efficiency

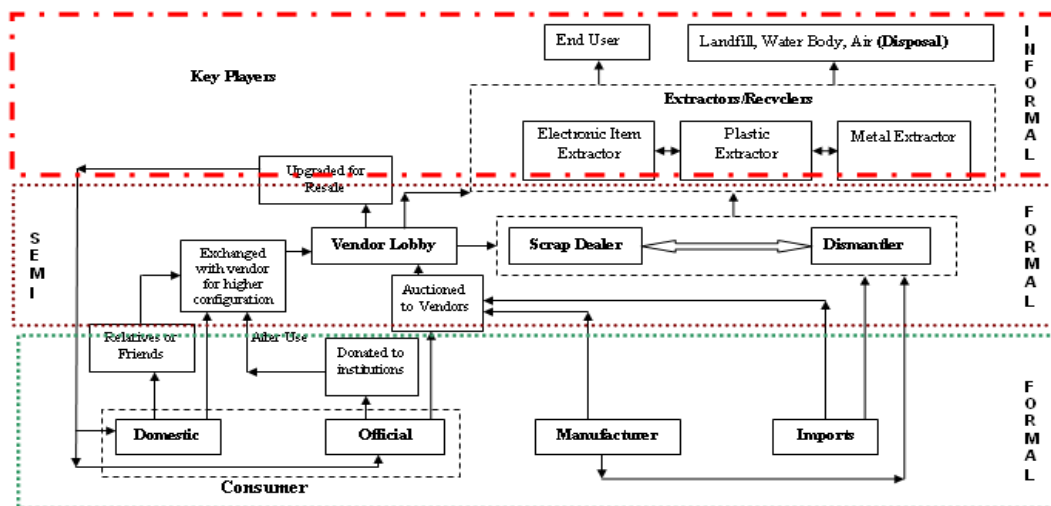
**Water Resources
Management**

E-waste Management

IRG Systems South Asia (P) Ltd. (IRGSSA) is a New Delhi, India based subsidiary of International Resources Group (IRG), an L3 Company, USA. The firm is registered in India as a management-consulting firm, providing worldwide management consulting services in environment, energy, natural resources, and disaster management. The firm provides international quality service to clients specifically providing customized solutions to client's needs. These clients include national and provincial governments, private corporate houses, multi and bilateral donor agencies like UN, The World Bank, The Asian Development Bank, USAID, multinational companies, NGOs and industries.

The firm has carried out a number of projects on e-waste management in India and abroad. The firm's e-waste management practice is recognized globally for its experience. It has ten publications in international journals/ books to its credit and has received high national and international print/ audio/ video media attention for its work on e-waste management. The experts from the firm are invited at various national/ international forums/ workshops (academic/ multilateral) to provide value added inputs on issues like policy, planning, regulatory, prevention and control including 3 Rs. A glimpse of the work experience is highlighted in the following sections.

Electronics industry is the world's largest and fastest growing manufacturing industry. Rapid growth, combined with rapid product obsolescence and discarded electronic and electrical equipments is now the fastest growing waste stream in the industrialized world. The growing quantity of waste from the industry, known as e-waste is beginning to reach disastrous proportions. Industrialized countries all over the world are beginning to address e-waste as it is inundating solid waste disposal facilities, which are inadequately designed to handle such type of wastes. In both developed and developing countries, the leakage of e-waste to informal/ unorganized sector is creating environmental problems. IRGSSA has experience of mapping the e-waste "trade value chain" by tracking e-waste material flow through "tracer technique" covering both formal and informal sectors in a geographic region by carrying out extensive field work and usage of satellite based GIS techniques. This has resulted in preparation and analysis of e-waste toxic footprint, material dismantling, and recycling and trade economics. An example of the trade chain is shown below.



IRGSSA is facilitating clients and regulatory authorities in addressing the regulatory requirements, proper identification, collection, storage, processing, treatment and disposal of these materials. Sample of important projects showing experience of the firm in providing a bouquet of services in the area of e-waste is given below.

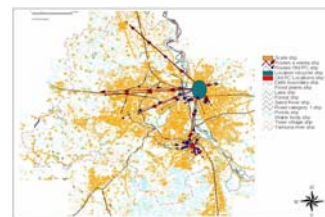
IRG – SSA's E-Waste Project Profile in India

1. Pilot E-waste Assessment in Delhi (2003-04): Management, Handling & Practices of e-Waste Recycling in Delhi, (Client: MoEF / Govt. of India / CPCB / GTZ / SECO)



This study was designed as a first ever e-waste assessment study in the country. The study was funded by Swiss Government/ SECO / EMPA and was aimed to establish approach and methodology for e-waste inventorization in India. The scope of study included e-waste assessment including e-waste generation, dismantling and recycling in the city of Delhi.

IRGSSA carried out fieldwork, identified the e-waste tracers including e-waste supply routes, e-waste processing places, e-waste recycled products, e-waste environmental and social impacts in the city of Delhi. Based on the resource mapping IRGSSA carried out tracer analyses to establish the e-waste trade value chain and associated economics of the trade. The entire e-waste supply chain was mapped in the spatial context on the GIS platform. IRGSSA developed thirty-two layered map of Delhi region including physical, geographical and man made features ex. Water bodies, rivers, water supply lines, sewerage & drainage etc.



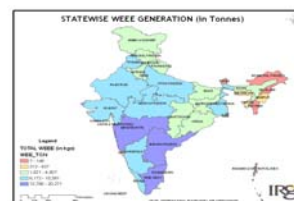
Outcome:

The findings of the study was discussed in March 2004 in a national workshop organized by MoEF, GOI and CPCB in March 2004 resulting in the formation of national level task force in India and country level WEEE/E-waste inventorization in India..

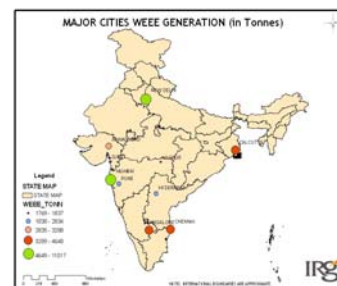
2. Country Level WEEE / E-Waste Assessment (2004-05): (Client: MoEF / Govt. of India / CPCB / GTZ)

The objective of this study was to identify and assess the total quantity of WEEE/E-Waste generation, recycle reuse and disposal in different cities in India through secondary sources. The major objectives of this study are as follows:

1. Assessment of existing quantity of WEEE/E-Waste in India
2. Assessment of existing quantity of WEEE/ E-Waste in states of India
3. Assessment of existing quantity of WEEE/ E-Waste in cities of India
4. Prioritization of states and cities generating WEEE/ E-Waste in India
5. Preparation Of budget and schedule for carrying out rapid WEEE/ E-Waste assessment in different cities in India.



IRGSSA carried out assessment to establish the WEEE/ E-Waste quantities at national, state and city level in India. The study used the approach and methodology standardized by IRGSSA for Delhi study and established obsolescence rate for Refrigerators, TVs, Washing machines and PCs in India. Further, IRGSSA carried out the survey and market assessment of existing installed base of these products in India and estimated the WEEE generation at the three levels i.e. national, state and city level. Based on these estimations top ten Indian states and top Ten Indian Cities were identified which constitute more than 60 % of total WEEE in India.



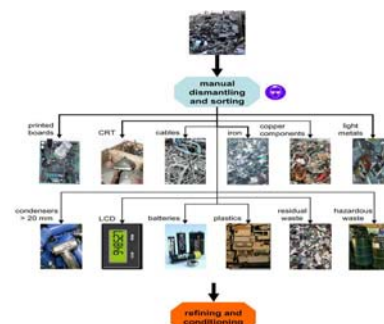
Outcome:

The outcome of this study was a national workshop disseminated in June 2005, which led to scoping of ESM guideline of e-waste in India and inventorization of WEEE/E-Waste in Mumbai and Pune.

3. Development of Environmentally Sound Management (ESM) Guidelines for E-Waste (2005-2007): (Client: MoEF / Govt. of India / CPCB)

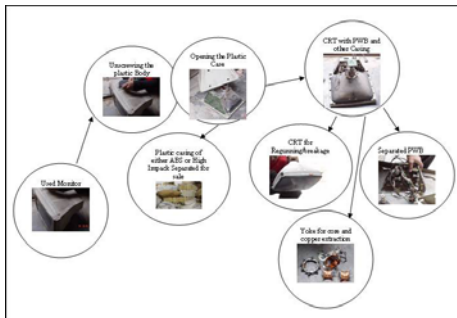
In order to abate and control pollution from E-waste, national guidelines have been prepared for "Environmentally Sound Management" of e-waste in India. This includes developing guidelines for e-waste dismantling and disposal including printed circuit boards.

IRGSSA has carried out due diligence on assessing the nature of e-waste being generated from TV, Personal Computers, Refrigerators, Washing Machines and printed circuit boards. This includes characterization and classification of waste and its coverage under the existing Indian regulations and standards. IRGSSA developed guidelines on the definition and



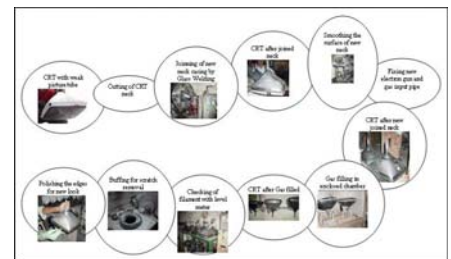
classification of e-waste. Further, studies were carried out to assess the impacts and the type of dismantling facility required for environmentally safe disposal of such type of e-waste fractions. This also include the assessment of best available technological options in the world and their customization to Indian conditions. Finally it assists regulators to grant "Consent to Establish" and "Consent to Operate" to e-waste dismantlers and recyclers. These guidelines have been notified by MoEF/Gol and are available on www.cpcb.nic.in.

4. Rapid e-waste Assessment in Mumbai Metropolitan Region(MMR) (2006-2007):
(Client: Maharashtra Pollution Control Board / UNEP)



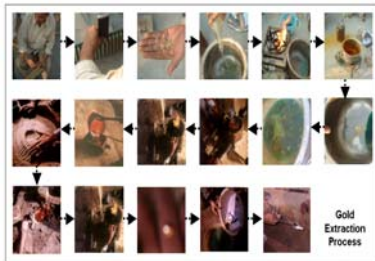
MMR was identified as the major generator e-waste in India. Therefore a rapid WEEE/e-waste assessment was carried out by IRGSSA. The three components that were studied as part of WEEE included Personal computer/TV/Mobile phones.

IRGSSA carried out fieldwork, identified the e-waste tracers including e-waste supply routes, e-waste processing places, e-waste recycled products, e-waste environmental and social impacts in the Mumbai Metropolitan Region. Based on the resource mapping IRGSSA carried out tracer analyses to establish the e-waste value



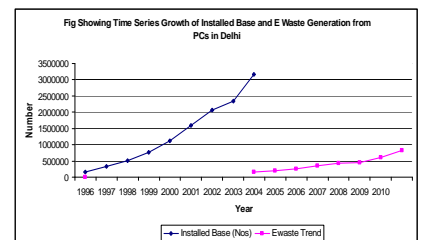
chain and associated economics of the trade. Further IRGSSA assessed the obsolescence rate for TV and Personal Computer and carried out e-waste generation analysis in the MMR. The entire e-waste supply chain was mapped in the spatial context on the GIS platform. IRGSSA developed thirty-two layered map of Mumbai region including physical, geographical and man made features ex. Water bodies, rivers, water supply lines, sewerage & drainage etc.

5. Rapid e-Waste Assessment in Pune Municipal Corporation and Pimpri Chinchwad Municipal Corporation Regions (2006-07):
(Client: Maharashtra Pollution Control Board / UNEP)

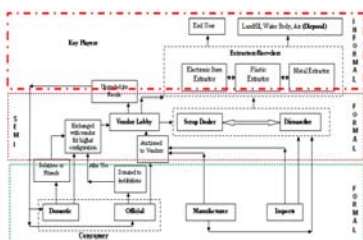


Pune Municipal Corporation and Pimpri Chinchwad Municipal Corporation Regions were identified among the top ten cities in India generation high quantities of e-waste. This area includes Pune city as well as its surrounding semi-urban and rural areas. Therefore, e-waste inventorization studies were carried out by IRGSSA on behalf of MPCB / UNEP. The outcomes of the study are available at www.mpcb.mah.nic.in.

IRGSSA carried out fieldwork, identified the e-waste tracers including e-waste supply routes, e-waste processing places, e-waste recycled products, e-waste environmental and social impacts in the study area. Based on the resource mapping, IRGSSA carried out tracer analyses to establish the e-waste value chain and associated economics of the trade. Further IRGSSA assessed the obsolescence rate for e-waste items and carried out e-waste generation analysis in the study area. The entire e-waste supply chain was mapped in the spatial context on the GIS platform. IRGSSA developed thirty-two layered map of Pune region including physical, geographical and man made features ex. Water bodies, rivers, water supply lines, sewerage & drainage etc. The outcomes of the study are available at www.mpcb.mah.nic.in.



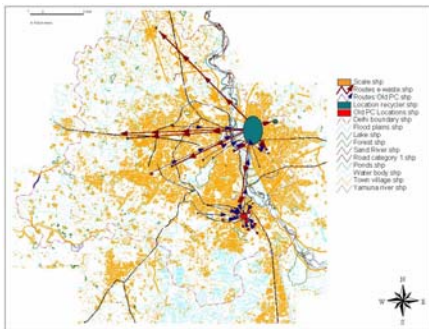
6. WEEE: Dismantling Facility, "Risk Assessment & Evaluation" (2007):
(Client: Infotrek / International Finance Corporation)



M/s Infotrek Syscom Ltd. had applied to International Finance Corporation (IFC) to finance E-waste/ WEEE dismantling facility in India. In response to this application IFC/ Infotrek approached IRGSSA to carry out due diligence for risk assessment and evaluation of such type of facility in India. The terms of reference consisted of: (i) market analysis; (ii) logistics and feedstock of e-waste collection; and (iii) technology. The major objective of the study was to advice on the risks associated with a potential IFC investment, based on a review of the information given by the company, and based on any available information. It resulted in a report containing the identification of the risks, together with their evaluation and finally establish financial viability and techno-economic feasibility of such type of project.

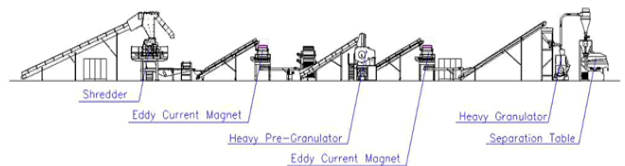
IRGSSA carried out Market analysis, including estimates of demand, supply, imports, prices, and competition. In addition, information on the market whereabouts and the legislation's evolution. IRGSSA identified market risks and regulatory risks. IRGSSA assessed the technical process and the machinery, in view of the limited information available on the patent documents and identified the technology risks. IRGSSA further described the logistical issues of feedstock collection, the context in which this new industry is expected to perform and evaluated the risks. IRGSSA developed and evaluated business model thereby giving advice on the operational assumptions taken in the business model, particularly the material costs and the prices assumptions. IRGSSA finally prepared risk profile of the entire business and developed scenarios for the business model. Further, IRGSSA carried out financial analysis using such scenarios and established financial viability and techno economic feasibility of the project. Based on the output of the due-diligence, the report has been accepted by IFC and the project was favorably considered for investment.

7. WEEE/E-Waste Dismantling Facility, “Detailed Project Report” (2007-2009)

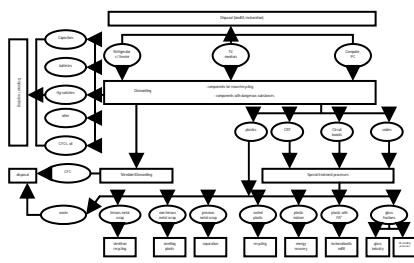


IRGSSA has prepared detailed project reports for six e-waste recyclers in order to establish six recycling facilities in different geographical zones of the country. IRGSSA was appointed by them to carry out due diligence for risk assessment and evaluation of such type of facility in India. The terms of reference consisted of: (i) market analysis; (ii) logistics and feedstock of e-waste collection; and (iii) technology. The major objective of the study was to contribute to giving advice on the risks associated with a potential investment, based on a review of the information given by the company, and based on any available information. This six projects resulted in six reports, together with their evaluation and finally establish financial viability and techno-economic feasibility of such type of project. IRGSSA was also mandated to pursue technical tie up with a foreign collaborator.

IRGSSA carried out a detailed market analysis IRGSSA carried out market analysis, including estimates of demand, supply, imports, prices, and competition. In addition, information on the market whereabouts and the legislation's evolution. IRGSSA identified market risks and regulatory risks. IRGSSA assessed the technical process and the machinery, in view of the limited information available on the patent documents and identified the technology risks. IRGSSA further described the logistical issues of feedstock collection, the context in which this new industry is expected to perform and evaluated the risks. IRGSSA developed and evaluated business model thereby giving advice on the operational assumptions taken in the business model, particularly the material costs and the prices assumptions. IRGSSA finally prepared risk profile of the entire business and developed scenarios for the business model. Further, IRGSSA carried out financial analysis using such scenarios and established financial viability and techno economic feasibility of the project. Based on the output of the due-diligence, six detailed project report have been prepared including recommended technology and conceptual design and engineering. IRGSSA also facilitated technology tie up with International e-waste dismantling technology provider.

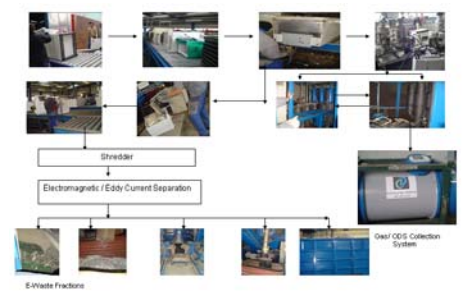


8. Feasibility and conceptual design and engineering study for WEEE/E-Waste (2008): Collection, transportation and dismantling facility for GIFT City (Client: IL&FS / Govt. of Gujarat)



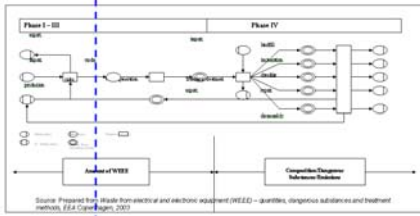
M/s IL&FS Ecosmart Ltd. as project consultant for solid waste management of “GIFT City” near Ahmadabad had sought the services of IRGSSA to develop conceptual design, engineering, cost estimates and budget for e-waste management of GIFT City in Gujarat. GIFT city is proposed to be the financial hub in Gujarat equipped with “state of art” urban facilities/ utilities in India. The major objective of the study was to contribute on the design of e-waste collection, transportation and dismantling facility for e-waste management in the city.

IRGSSA carried out a detailed market analysis of e-waste generation based on predicted installed base of EEE items. This included projections of e-waste for the thirty years from the time of commissioning of project based on population, land use and expected consumer behavior in the city. By using quantitative techniques life cycle of the EEE was determined and e-waste generation was predicted. E-waste items included PCs/ Laptops, TVs, Refrigerators, washing machines, cell phones and CFLs. Further depending on the type of E-waste and land use, collection points were fixed and mode of collection e.g. bins size/ container sizes etc were fixed. The transportation mechanism was also established and



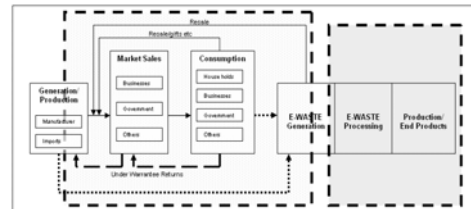
specifications for vehicles and collection infrastructure including frequency of collection were fixed. Further, IRGSSA carried out feasibility of e-waste dismantling facility by fixing its size and specifications of the machinery required. A detailed bills of quantity (BOQ) was prepared based on specifications and cost estimates. Further, total budget and area requirement for e-waste collection, dismantling and recycling system was fixed.

9. Development of E-Waste Assessment Manual and E-Waste Management Manual (2007):
(Client: UNEP/DTIE)



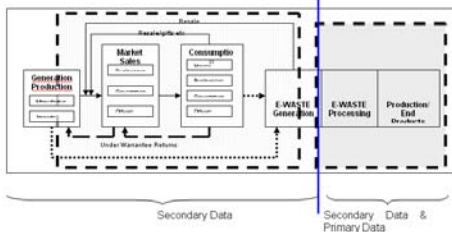
The United Nations Environmental Programme (UNEP) through International Environmental Technology Centre (IETC), Division of Technology, Industry, and Economics (DTIE) is implementing Integrated Solid Waste Management (ISWM) based on 3R (reduce, reuse and recycle) in urban areas of Asia-Pacific and Africa. This project aims to promote identification and implementation of environmentally sound technologies (ESTs) for the elements of ISWM including collection, segregation, transportation, treatment, disposal, and recovery and recycle.

Integrated Solid Waste Management covers all types of wastes in an integrative manner from all the waste sources including e-waste from municipal and industrial sources. As a part of Integrated Solid Waste Management Project, UNEP DTIE - IETC prepared two manuals on e-waste that can be used by the practitioners and decision-makers to manage e-waste in an environmentally sound manner. Mr Amit Jain through IRGSSA prepared these two manuals.



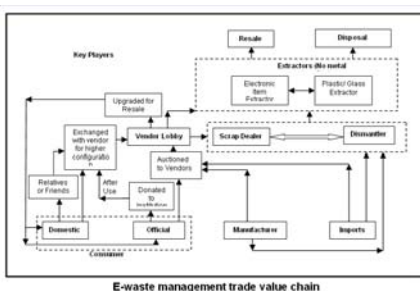
The first manual covered the guidelines for the assessment of e-waste within a city or a geographical area. The second manual covered the guidelines to manage e-waste by identifying the e-waste trade value chain (primary dismantlers, secondary dismantlers and tertiary dismantlers or metal extractors) and the appropriate technologies required to dismantle and recycle e-waste.

Demarcation of WEEE/E-waste trade value chain for Inventory Assessment



Two manuals on WEEE/ E-waste Assessment & WEEE / E-waste Management were prepared as guidance documents to implement WEEE / E-waste inventory assessment project & WEEE/ E-waste management project respectively in a time bound manner. These manuals have been prepared after collection of data from secondary sources including publications from scientific journals, reports and web sites. A case study based approach has been adopted to provide the practitioner examples of live situations so that it can be adopted in a country / geographical region or city. The extent and coverage of these manuals include all the countries, where WEEE / e-waste projects have been initiated. The two manuals are available on www.unep.or.jp.

10. Development of an E-waste Business Model (2008-2009):
(Client: Maharashtra Pollution Control Board)



In MMR the major objective of this study was to assess the technical and financial viability of 1st, 2nd and 3rd level e-waste recycling infrastructure in order to understand the evolving E-waste recycling industry, risk profiling, the role of the state agencies like MPCB, MMRDA and other stakeholders in order to promote E-waste infrastructure development in the state. The detailed SOW to carry out this study is given below.

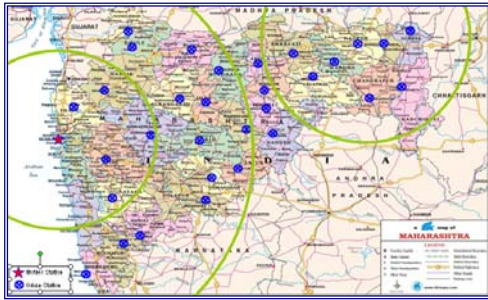
- Giving an advice about the fixing the scale of operation, size of the plant, technical process, process flow diagrams, machinery and specifications, technologies considering E-waste in MMR, Maharashtra and India.
- Describing the logistical issues of feedstock collection, the context in which this new industry is expected to perform, evaluate the risks.
- Assessment of the downstream market and the revenue generation model
- Giving advice on the operational assumptions taken in the business model, particularly the material costs and the prices assumptions.
- Risk profiling and its documentation.

- Market analysis, including estimates of demand, supply, imports, prices, and competition in Maharashtra, availability and sources of raw material.
- Regulatory requirements to establish such facility

Evidences of air, water and soil pollution and Occupational, Health and Safety Hazards

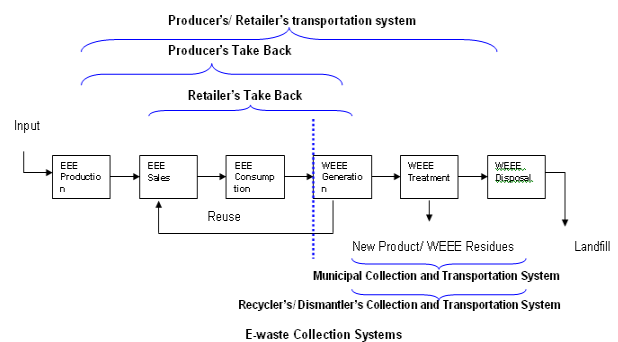


- Financial viability- project costs estimates including capital and operating expenditure and revenue generation, payback period, IRR etc.
- Business model –Assessment of different business models e.g. private/ PPP in the state. Government's contribution and type and extent of subsidies/ incentives in the state.
- Assessment of institutional capacity for implementation of such type of projects.
- Road map and next steps consisting of business plan and time line.



The above mentioned Study has been completed by carrying out detailed e-waste market assessment at regional, state level and national level to determine the availability of raw material in terms of e-waste potential and its collection efficiency. This included assessment of the logistical issues of e-waste collection, transportation, future e-waste flows and infrastructure required. Regulatory environment in terms of applicable rules at local, regional, state, national and international level have been assessed. The output of e-waste treatment facility has been assessed in terms of expected revenue from national and international market. SWOT analysis has also been carried out followed by assessment of risks.

Based on the output of this assessment, design and engineering of the e-waste recycling plant has been established. This also included technology required at 1st level, 2nd level and 3rd level of treatment as per CPCB guidelines and identification of technology suppliers in India and abroad. Further assessment of financial viability of the project in terms of payback period, NPV and IRR has been carried out. Depending on the cost estimates and revenue model, a business model has been proposed. This made also included development of Public Private Partnership Model (PPP) and assessment of institutional capacity to implement this model. Finally a business plan including time line for implementation of this model has been identified and described in the report.

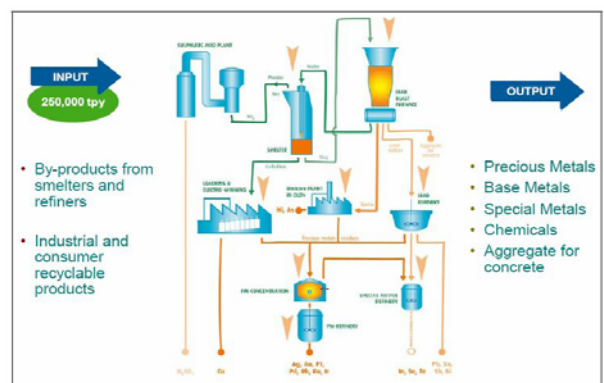


11. Development of e-waste master plan for PhnomPenh city, Cambodia (2009-2010): (Client: UNEP/DTIE/IETC/MoE, Cambodia)

E-waste master plan for Phnom Penh city, Cambodia has been prepared by Mr. Amit Jain through IRGSSA. This included reports on e-waste inventorization in the city, e-waste recycling system, e-waste pilot study on collection and transportation and e-waste business model. The findings of the reports have been presented at different UN forums and accepted by the client. The entire project has been resulted in the capacity building of project team consisting of representatives from ministry of environment, Government of Cambodia, Phnom Penh Municipal Corporation and NGOs.

12. WEEE: Recycling Facility, “Detailed Project Report” (2009) (Client: M/s. KRL Recyclers Ltd.)

IRGSSA carried out Market analysis, including estimates of demand, supply, imports, prices, and competition. In addition, information on the market whereabouts and the legislation's evolution. IRGSSA identified market risks and regulatory risks. IRGSSA assessed the technical process and the machinery, in view of the limited information available on the patent documents and identified the technology risks. IRGSSA further described the logistical issues of feedstock collection, the context in which this new industry is expected to perform and evaluated the risks. IRGSSA developed and evaluated business model thereby giving advice on the operational assumptions taken in the business model, particularly the material costs and the prices assumptions. IRGSSA finally prepared risk profile of the entire business and developed scenarios for the business model. Further, IRGSSA carried out financial analysis using such scenarios and established financial viability and techno economic feasibility of the project. Based on the output of the due-diligence, a detailed project report has been prepared including recommended technology and conceptual design and engineering. IRGSSA will also facilitate technology tie up with an international E-waste / WEEE dismantling technology provider.





13. Electronic Waste Management Project (2010-11) (Client: IL&FS Waste Management & Urban Services Ltd)

IRGSSA carried out Market analysis, including estimates of demand, supply, imports, prices, and competition. In addition, information on the market whereabouts and the legislation's evolution. IRGSSA identified market risks and regulatory risks. IRGSSA assessed the technical process and the machinery, in view of the limited information available on the patent documents and identified the technology risks. IRGSSA further described the logistical issues of feedstock collection, the context in which this new industry is expected to perform and evaluated the risks. IRGSSA developed and evaluated business model thereby giving advice on the operational assumptions taken in the business model, particularly the material costs and the prices assumptions. IRGSSA finally prepared risk profile of the entire business and developed scenarios for the business model. Further, IRGSSA carried out financial analysis using such scenarios and established financial viability and techno economic feasibility of the project. Based on the output of the due-diligence, a detailed project report has been prepared including recommended technology and conceptual design and engineering. IRGSSA will also facilitate technology tie up with an international E-waste / WEEE dismantling technology provider.

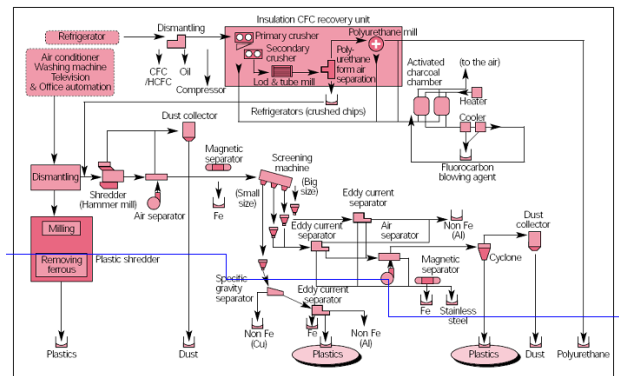
14. Consultancy Services for Revalidation of the existing Feasibility Report and carryout Bid Process Management for selection of Private Developer for Construction, Operation and Management of the Proposed E-waste Disposal Facility in Mumbai Metropolitan Region (2010) (Client: Mumbai Metropolitan Regional Development Authority (MMRDA))

IRG System South Asia Pvt. Ltd. had prepared a "Feasibility Report & Development of a Business Model" on E-waste Management for Maharashtra Pollution Control Board in 2007-08. Based on the recommendations of this report, Government of Maharashtra nominated Mumbai Metropolitan Regional Development Authority (MMRDA) to implement the project in PPP mode. In this context MMRDA appointed M/s. Deloitte Touche Tohmatsu India Pvt. Ltd. & IRG System South Asia Pvt. Ltd. as transaction advisor for this project. The detailed Scope of Work (SoW) included revalidation of 2007-08 report, and business model, development of RfP and concessionaire agreement, carry out bid process management and assist in selection of operator under PPP.

IRGSSA provided technical assistance for –

Feasibility Study:-

- Revalidation of Existing Feasibility Report and Business Model;
- Discussions with all the stakeholders about their opinions/possibilities/ opportunities;
- To assess the cost estimates for the selected model as provided in the report and revise, if needed with respect to current scenario;
- To identify additional revenue sources (apart from the ones identified in the existing report) to recover the cost of Project;
- Suggest a business model for the successful operation on PPP basis during the construction period and O&M; and
- Financial viability analysis, Ratio analysis, Break-even analysis, IRR and Cash Flow, etc.



Project Structuring:-

- Identification of the preferred PPP structure & Present the comparative analysis with recommended model under the existing and emerging e-waste market / business in India.
- Preparation of a Detailed Project Structure for implementation of the project, based on Public Private Partnership.

Legal Review:-

The Legal Review will provide information on the relevant laws and regulations that might have an impact on the development of the Project, private sector participation and financing of the Project. The Consultant will examine and suggest suitable legal and institutional frame-work, for implementation, operation and maintenance of the project. This would also include the impact of policy decisions by the Government, amendments to the existing acts, rules etc., as may be required.

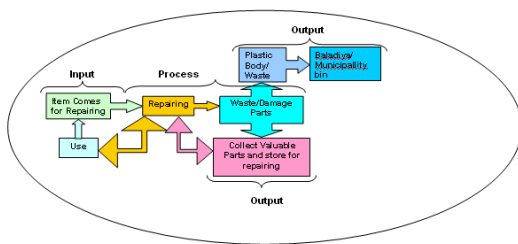
Phase II: Bid Process Management

- Prepare Expression of Interest / RFQ or both as the case may be, for inviting proposals from eligible bidders.
- Prepare project information memorandum.
- Meet potential bidders to promote the project and encourage them to participate in the bidding.

- d. To assist the MMRDA in responding to the queries that may be raised during the pre-bid meetings and prepare minutes along with addendum / corrigendum to the bid documents as required.
 - i. Assist MMRDA in Evaluation of Request for Qualification and short-listing of qualified bidders for the next stage.
 - ii. Upon receipt and opening of bids, facilitate MMRDA to prepare technical and financial bid evaluation reports with recommendations.
 - iii. To prepare legally vetted concession contract agreement or any other agreement for the project.
 - iv. Assistance in signing of the agreement with the selected private developer.
 - v. Post award Assistance till financial closure of the project.

15. Feasibility Study for Management of Electronic Waste in Oman (2011)
 (Client: Oman Environment Services Holding Co. S.A.O.C. (OESHCo), Government of Oman)

For TV, Computer, Mobile Phone Repair Shop

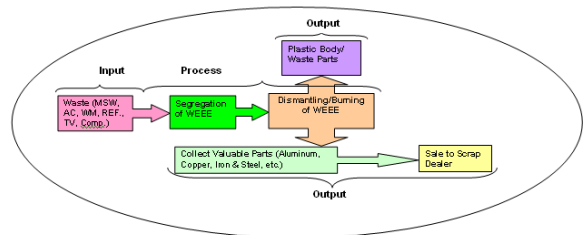


WEEE/E-waste is a new type of waste stream, which requires scientific management in Sultanate of Oman. This waste stream emanates from consumption of electrical and electronic equipment. The increasing market penetration of the consumer electronics will lead to reduced life of electronics items and greater generation of WEEE / E-waste in Oman. **In this context, Oman Environmental Services Holding Company SAOC (OESHCo), a Government of Oman holding company, is carrying out feasibility study for WEEE/E-waste management in the country, and awarded the work to M/s Bishara Est. LLC in consortium**

with IRG Systems South Asia Pvt. Ltd. The objective of this study is to develop a comprehensive E-waste management strategy and develop a business model in Oman through the active involvement of the private sector. The other sub objectives of this study are :

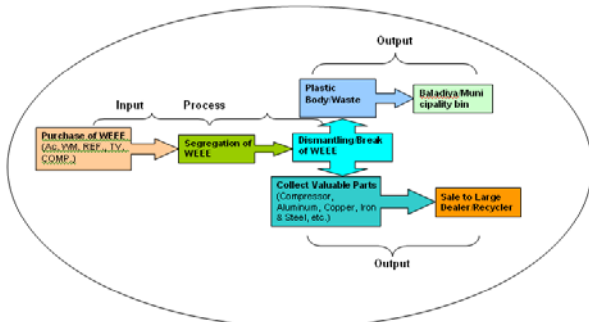
To initiate project developments in the Sultanate through the active participation of the private sector; To ensure enhanced waste management practices; To promote potential employment opportunities for local people; To develop a management plan for the collection, storage, processing and disposal of E-waste; To minimize the threat to public health and environment resulting from the improper storage and disposal of E-waste; and To maximize the retrieval of valuable resources by promoting E-waste recycling and energy recovery.

For Dump Site



The detailed scope of work includes development of regulatory framework, assessment of E-Waste market, E-Waste inventORIZATION, assessment of technological options, financial viability and development of business model including public private partnership model.

For Scrap Dealer



E-waste items included PCs / Laptops, TVs, Air Conditioners, Refrigerators, Washing Machines and mobile phones.

IRGSSA has followed a very comprehensive approach and methodology to carryout this study based on the approach & methodology followed by countries in EU. This approach & Methodology has been customized as per the guidance described in UNEP manuals 1 & 2. In this context; it may be mentioned that EEE market in Oman is a growing market, while EEE market in EU is a saturated / replacement market. IRGSSA has carried out the activities stepwise as

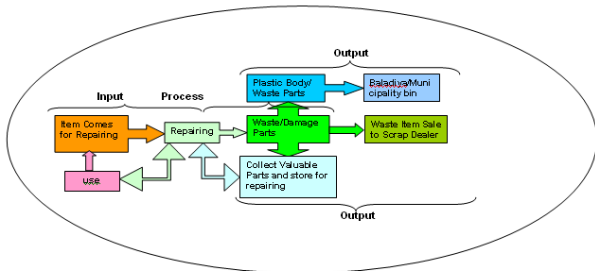
described below.

Activity 1: Developed Policy & Regulatory Framework; Activity 2: Assessed WEEE / E-waste Market; Activity 3: Selected Methodology for WEEE / E-waste InventORIZATION; Activity 4: Carried out WEEE / E-waste Inventory Assessment; Activity 5: Identified the different stages and technologies for WEEE / E-waste Management; Activity 6: Developed Financing Mechanism of WEEE / E-waste Management; and Activity 7: Performed critical risk analysis and developed business model for WEEE / E-waste Management

The study area included entire Sultanate of Oman. This included Four Governorates (Muscat, Dhofar, Musandam and Al Buraimi) and five regions i.e. Al Batinah (South & North), Al Dakhiliya, Al Dhahira, Al Sharqiyah and Al Wusta.

IRGSSA carried out primary survey by first covering the Muscat governorate following the tracer techniques. Then starting from Dhofar region covering Salalah, Taqah, Mirbat, Sadah and Thumrait, Al Wusta region covering Haima and neighbouring areas were surveyed followed by Adam and Nizwa in the Al Dakhiliya region. From Adam field survey was carried out at Al Sharqiyah region covering Al Mudhaibi, Sinaw, Ibra and Sur, Ibri, and Al Buraimi in the Al Dhahira region, to Al Rustaq, and Sohar in the Al Batinah region and to Khasab in the Musandam Governorate.

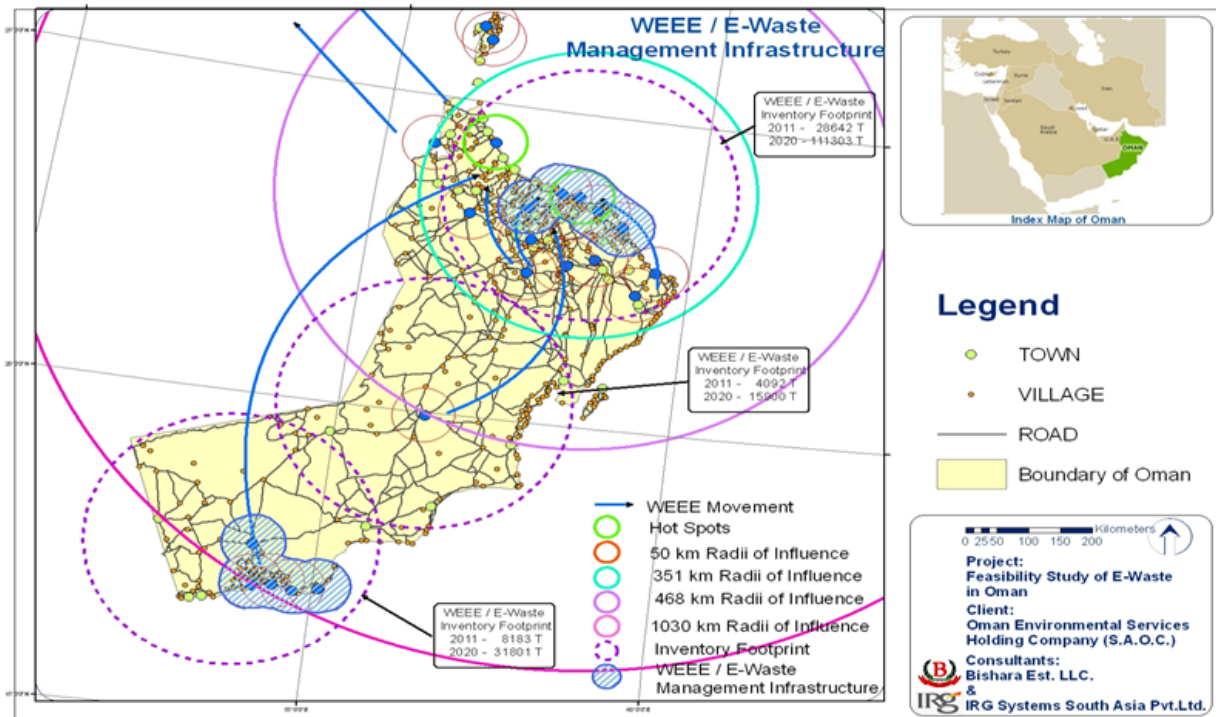
For AC, Washing Machine, Refrigerator Repair Shop



The tracer technique established the “Material Flow Chain”, existing E-waste market, dismantling & recycling practices, quantum of E-waste generation & trade economics. The entire material flow chain was geographically mapped using GIS techniques as well as photo-documented for the entire country. GIS technique was also used for mapping of broad land use classification, analysis of primary & secondary data was done. GIS based thematic maps were generated for the study area of Oman based on tracer analysis.

IRGSSA also carried out a detailed market analysis of E-waste generation based on predicted installed base of EEE items. This included projections of E-waste for the next ten years from the time of commissioning of project in the Sultanate of Oman. Based on quantitative techniques, life cycle of the EEE was determined and E-waste generation was predicted. IRGSSA carried out feasibility of E-waste dismantling facility by fixing its size and specifications of the machinery required. A detailed bill of quantity (BOQ) was prepared based on specifications and cost estimates were fixed based on availability of each item. Further, total budget and area requirement for E-waste collection, dismantling and recycling system was fixed.

Two business models, one on the short term basis and the other on long term basis have been developed. Different types of interventions covering regulatory, planning & implementation to be implemented by different regulators have been recommended.





- Feasibility or risk analysis
- Waste characterization studies
- Impact assessments
- Source reduction
- Hazard and exposure assessments
- Strategic planning for solid waste and hazardous waste management
- Landfill management
- Technology reviews
- Electronic databases for Material Safety
- Emergency response planning



Contact Details:

IRG Systems South Asia Pvt. Ltd.
BC - 10 & 11, Highway Tower - 1,
Sector - 62, NOIDA,
Uttar Pradesh
irgssa@irgssa.com