

## **STATUS OF IMPLEMENTATION OF E-WASTE (MANAGEMENT & HANDLING) RULES, 2011 IN JAMMU AND KASHMIR (2013-14) CASE STUDY: JAMMU**

**\*Anuradha, Showkat Chowdhary and Abdul Razak**

*J & K State Pollution Control Board, Parivesh Bhawan, Narwal, Gladni, Jammu*

*Parivesh Bhawan, Gladni, Jammu*

*\*Author for Correspondence*

### **ABSTRACT**

Due to strong economic growth, increasing per capita incomes and a relatively young population structure, the nations in the Asian region are rapidly changing their consumption patterns of electronic appliances. It has been established in earlier studies that in developing countries like India, e-waste generation has shown a sharp rise in the last decade owing to rise in population, changes in life style and changes in trends. This paper highlights the present status of E-waste generation and management in State of Jammu and Kashmir for the year 2012-2013. The total annual E-waste generated in the State of J&K for the year 2012-13 has been found to be app. 3260.4 tons. Per capita generation of E-waste has been estimated to be app. 0.26 Kg for the year 2012-13 which is app. 5 times higher as compared to previous data. The paper also discusses the status of implementation of E-waste Rules in the State and roles to be played by State Government and Producers for effective compliance as under the said Rules for scientific disposal of E-waste in the State.

**Keywords:** *E-waste, WEEE (Waste Electrical & Electronics Equipment), EEE (Electrical & Electronics Equipment), Obsolescence Rate, Scrap Dealers, Dismantlers*

### **INTRODUCTION**

Recent policy changes have led to an additional remarkable inflow of leading international electronic companies to set up manufacturing facilities and research & development centres for the hardware as well as the software sectors. Beside IT industrial growth, electronic appliances sales and purchase in individual households has also increased tremendously.

The increased growth rate of the IT and electronic industry is propelled by increased consumption of electronic items and IT hardware. The increased consumption pattern is leading to an increased obsolescence rate of these products which will result in the higher generation of electronic waste (E-waste). The increasing obsolescence rates of electronic products added to the huge import of junk electronics will create a complex scenario for solid waste management in India.

During the last decade, electronic industry has played an important role in providing a boost to the socio-economic and technological growth of a developing society. The consequences of its consumer oriented growth combined with rapid product obsolescence and technological advances are a new environmental challenge - the growing menace of "Electronics Waste" or "E-waste" that consists of obsolete electronic devices.

E-waste from developed countries find an easy way into developing countries in the name of free trade (Toxics Link, 2004) which is further complicating the problems associated with waste management. As there is no separate collection of E-waste in India, there is no clear data on the quantity generated and disposed of each year and the resulting extent of environmental risk. The preferred practice to get rid of obsolete electronic items in India is to get them in exchange from retailers while purchasing a new item. Obsolete computers from the business sector are sold by auctions. Sometimes educational institutes or charitable institutions receive old computers for reuse.

In their recent report, Recycling – From E-waste to Resources, the UNEP (2009a) estimates that global electronic garbage generation is growing at an annual rate of 40 million tonnes. The report further estimates that E-waste levels could rise by as much as 500% from present levels by the year 2020. The

## **Research Article**

report estimates that India will increase their E-waste (most notably cellular phone waste) by 18 times over the next 10 years. In India and China current E-waste flows from refrigerators will be multiplied by a factor 1.5 to 2 by the year 2020 (UNEP, 2009a).

It is estimated that of the total E-waste, only about forty percent finds its way into the recycling stream while the rest sixty percent remains in warehouses /storehouses due to poor / inefficient collection system. A significant proportion of the waste that finds its way into the recycling stream, especially televisions and mobile handsets, is refurbished and resold. Only about nineteen thousand tonnes representing just five percent of the total E-waste is processed in the country (Sycom Project, 2010a).

E-waste management in India has two broadly classified components, i.e., Informal Recycling and Formal recycling.

**Informal Recycling:** 95 % of the total recycling in the country comes under this category and is done by informal sector. This category involves skilled workers, ordinary instruments, unhygienic conditions etc. Major clusters of Informal groups are based in Delhi, Pune and Bangalore. These informal groups work under vast range i.e. collection, dismantling, refurbishment etc. The entire E-waste management business of informal groups develops within small units with low-skilled, mainly migrant labourers.

Informal sector can be classified in following hierarchy: Waste pickers, thiawalas (collectors), small kabaris (small middlemen), and big kabaris (larger middlemen) (Sycom Project, 2010b).

**Formal Recycling:** 5% of the total recycling in the country comes under this category and done by formal organization. This category involves highly qualified workers, well equipped recycling facility, fully hygienic conditions etc.

As per the census report, 2011 total population in J&K is 12,548,926 with percentage decadal growth of 23.71 (2001-2011). Growth of GSDP at Constant Prices during 2007-08 has been found to be 6.28% whereas the growth of NSDP at Constant Prices for 2009-10 has been found to be 6.63% (PHD chamber, 2011a). Population in Jammu, Kashmir and Ladakh regions is 53.50 lacs, 69.08 lacs and 2.90 lacs respectively (Census of India, 2011). As per the Census, 2011, Jammu district is most populated in the State followed by Srinagar and Anantnag.

Information Technology (IT) has an enormous influence on global economy. It has revolutionized the nature of human interaction and has become a prime mover for services. In Jammu & Kashmir, IT is still a sunrise industry.

IT Policy for the state of Jammu and Kashmir was launched in the year 2004 with the view that IT has the potential to grow very quickly to become a major player in the growth of the state's economy and contribute to better, transparent and effective governance (PHD Chamber, 2011b).

As per the inventorization made during 2009-10 by J&K State Pollution Control Board, total E-waste generation was estimated to be approximately 492.32 tons with per capita generation of 0.054 kg in the State. E-waste dismantled in the State was estimated to be 229 tons (2009-2010). Though informal sector is still playing a major role in handling and dismantling the E-waste, E-waste rules have been implemented by the Board to curb the unscientific management of the waste. The State Pollution Control Board has made various efforts to make awareness among the consumers and public at large regarding the responsibilities of various stakeholders in the E-waste value chain and the harmful impacts of unscientific disposal as well. E-waste collected by the informal sector is also assembled to some extent and reused under various local brands.

As far as manufacturing units are concerned, there are very few industrial units operating in the State of J&K. Few industrial units and sales offices operating under various brands have complied under Rules for implementation of 'Extended Producer Responsibility' (EPR). At present there are three authorized collection centres in the State. There is no disposal site / recycling facility in the State and all the e-waste except copper, aluminium, lead and iron is sent to Delhi / Punjab for further disposal in the informal sector. Major share of E-waste is still being collected and dismantled in the informal sector using rudimentary techniques in the absence of the installation of state of art technology and lack of effective awareness programmes regarding collection mechanism being put in place by key players in electronic industry.

## **Research Article**

### **MATERIALS AND METHODS**

#### **Methodology**

The inventorization on the E-waste generation and management in the capital cities and towns of J&K has been taken up to update the previous data obtained during 2009-10 so that trend may be established for the rise in E-waste during last 3-4 years.

The survey was carried out with following objectives:

- To make an assessment of the E-waste generation in the study area.
- To study the current status of E-waste management systems in place as a baseline for future action plans.
- To determine the E-waste value chain

The study has been carried out for the whole State as far as data on Sales of EEE and E-waste generation is concerned but case study has been delimited to the major cities and towns in Jammu region, viz., Jammu, Kathua, Udhampur, Akhnoor, Samba, Bari Brahmana and R.S. Pura.

The EEE items taken up under the survey are:

- i. Refrigerators
- ii. T. V. sets / LCD
- iii. Computers
- iv. Air Conditioner
- v. Printers
- vi. Washing Machines
- vii. Mobile phones

The best suited methodology for developing countries as per United Nations Environment Program's (2007), E-waste Assessment Manual is Market Supply Method which has been applied for the present assessment of E-waste generation in the State of J&K.

Under 'Market Supply Method' the estimation of WEEE (E-waste) is made from sales data, together with typical lifespan. Mathematically, the market supply method can be expressed as:

$$\text{WEEE generation (t)} = \text{sales (t - } d_N) + \text{reuse (t - } d_S)$$

Where,

$d_N$  - Average lifetime of new items

$d_S$  - Average lifetime of second-hand items

The average lifetime of new items has been taken from survey results as carried out by UNEP, 2009b. Quantity of waste in tons is calculated by multiplying the total sales figures by the default weight for each equipment (Table 1). The survey aimed to collect data for various aspects of EEE during its flow through various stages as Manufacturing, Sales, Refurbishment, Reuse, Storage and Disposal mechanism in the State of J&K. The data on the quantities of E-waste being dismantled and sent to neighboring States was also collected. Selected Institutions were visited to collect information on the consumer behavior patterns, way of disposal and quantities of EEE being disposed on yearly basis. The data from various stakeholders was collected through structured questionnaires specifically devised for the survey. In addition, interviews were also held with various stakeholders to gather information about the details of dismantling operations being carried out in the informal sector. The Stakeholders involved in the data collection have been categorized as below:

- a) End users: Households and Bulk Consumers.
- b) Channel members: Producers, Refurbishers, Service centres, Scrap dealers, Dismantlers.
- c) Distributors and Sales Offices

### **RESULTS AND DISCUSSION**

#### **Results**

##### **Manufacturers**

In J&K, there are only seven manufacturing units dealing with EEE covered under Schedule 1 of e-waste (Management and Handling) Rules, 2011 in Jammu region. Out of seven, there are two colour television assembling units.

## Research Article

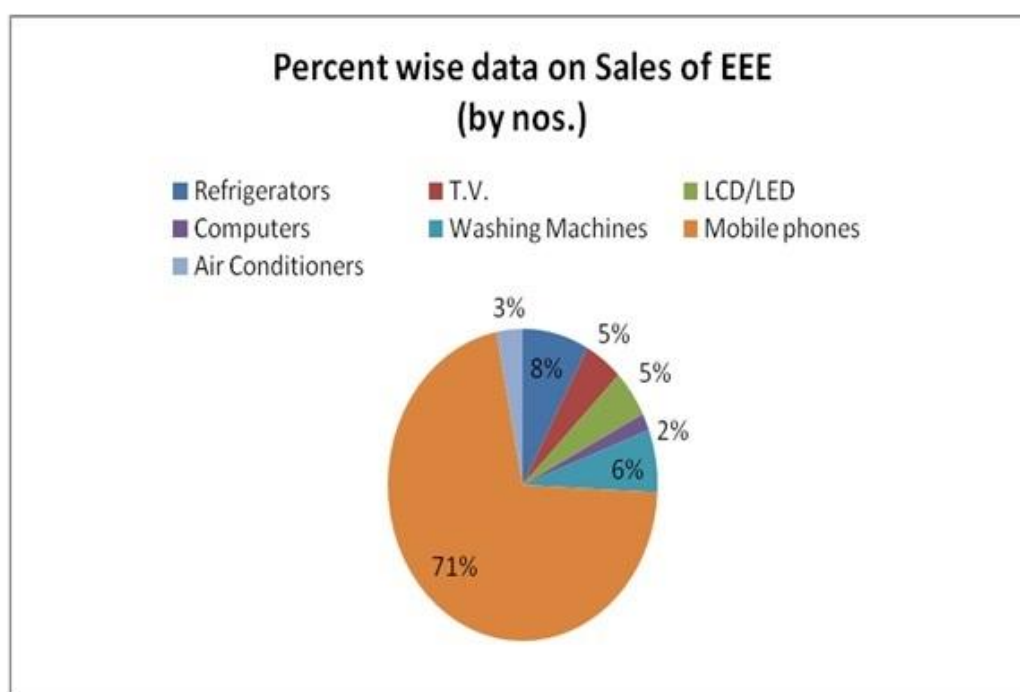
### Sales Data

Annual Sales figures were collected for all the EEE under survey from various companies selling their products in the State. As per the survey carried out for the year 2012-13, total no. of Refrigerators, T.V., LCDs / LEDs and Computers sold in the State are approximately 1,45,400, 84,000, 90,300 and 32,220 respectively whereas approximately 1,18,800, 59,510 and 12,99,400 no. of Washing Machines, A.C's, and Mobile phones were sold during the fiscal year 2012-2013 (Figure 1).

### E-waste Generation

As per the sales data of previous years collected from various companies and market survey and by applying average lifespan and default weight of EEE items, the E-waste generation in the State has been estimated to be app. 3260.4 tons for the year 2012-13 (Table 1).

Percent contribution of selected WEEE items has been worked out from the data on category wise E-waste generated and presented in table 2.



**Figure 1: Sales figures of different Electrical and Electronic Equipments in J&K**

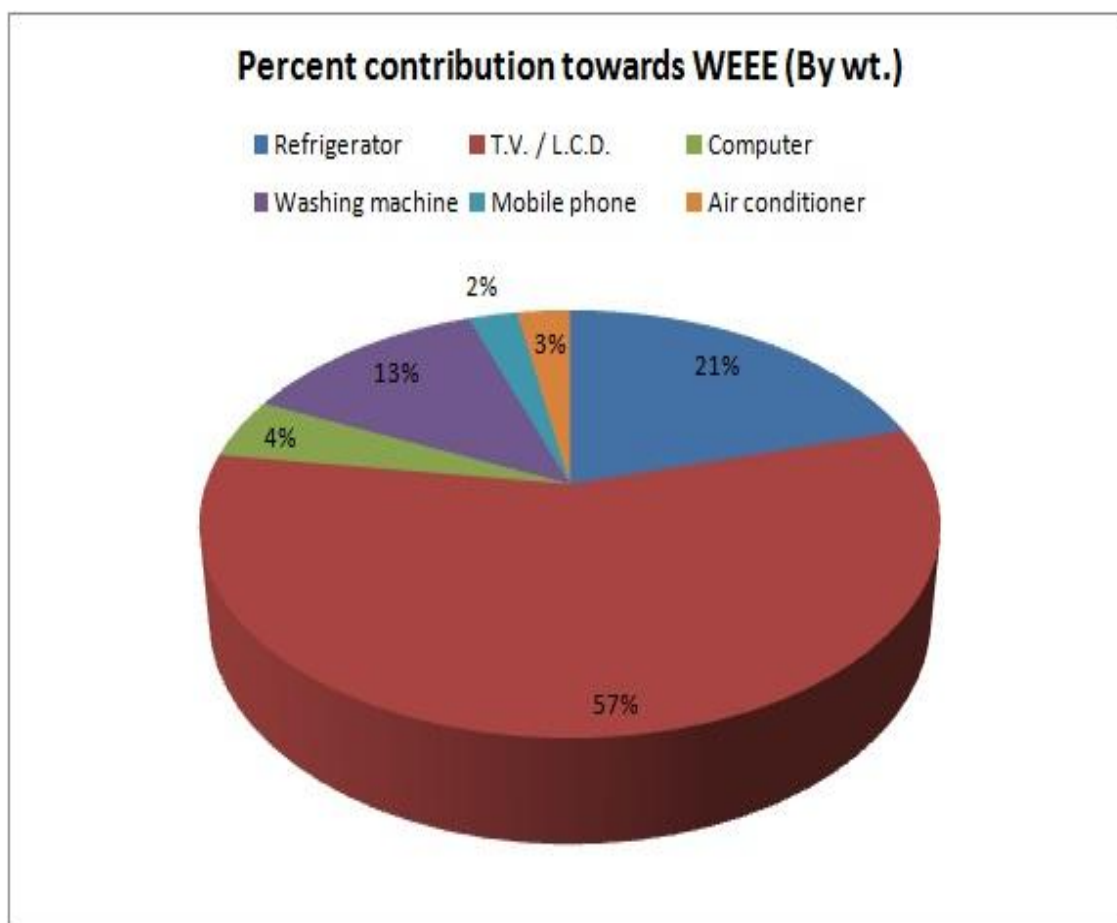
**Table 1: Quantities of E-waste generated from different categories of WEEE**

Appliance	Lifetime (in years)	Weight (default wt. In Kg)	Quantity of E-waste (Tons)
Refrigerator	10	48	672
T.V./ L.C.D.	8	36.2	1848
Computer	5-8	29.6	150
Washing machine	10	40 to 47	417
Mobile Phone	4	0.080 to 0.100	83.44
Air conditioner	5-8	20	90
<b>Total 3260.4</b>			

### Research Article

**Table 2: Percent contribution of WEEE towards Potential Annual E-waste generation**

S. No.	Name of EEE	Percent (%) contribution towards WEEE (By wt.)
1.	Refrigerator	20.61
2.	T.V./ L.C.D.	56.68
3.	Computer	4.6
4.	Washing machine	12.78
5.	Mobile Phone	2.55
6.	Air conditioner	2.76



**Figure 2: Contribution of different categories of WEEE towards E-waste**

### Collection Centers

In compliance to the e-waste (Management and handling) Rules, 2011, the individual as well as Common Collection Centres (CCC) are being set up in the State of J&K. There are three authorized collection centres, details are tabulated as below.



## Research Article

**Table 3: Status of Collection Centres in J&K State**

S.No.	Name and Address	Type	Dealing with	Quantity collected (Kgs)	Remarks
1.	Auctus Recycling Solutions Pvt. Ltd. Plot No. 105, ward no. 6, Narwal, Jammu	Individual	IT consumer equipments	15,215.70 (w.e.f. Mar-Aug, 2013)	Authorized (in agreement with LG company)
2.	Attero Recycling Pvt. Ltd. Purmandal morh, Kaluchak, Jammu	Common	IT consumer equipments	6765.23	Authorized as common collection centre (in agreement with Samsung, Videocon, Voltas, Acer, HCL, Haier etc.)
3.	Redington centre 3 B/B, Gandhi Nagar, Jammu	Service Individual	IT equipments	100	Independent and Authorized

### Scrap Dealers / Dismantlers

Scrap dealers were visited in selected areas to have estimation about the quantities of E-waste available for recycling. They were asked formal as well as informal questions as most of the people are not ready to share any information. As per the survey there are 4-5 large scale dismantlers in the Jammu region in the informal sector and few of them also collect waste from Srinagar. Since there are only three authorized collection centres in the State of J&K, most of the E-waste generally finds entry into the informal sector. The State Pollution Control Board is in the process of issuing notices to all the scrap dealers cum dismantlers to ensure compliance of E-waste (Management and Handling) Rules, 2011. The total E-waste available for recycling with the scrap dealers in Jammu region for the year 2012-13 has been estimated to be 353.19 tons only.

### Discussions

#### Sales and Consumption Patterns of EEE

There are very few no. of manufacturing units in the State. However, the sales operations being carried out by the National Distributors and regional level sales offices reveal that there has been a sharp rise in the sale of EEE gadgets over the past 3-4 years owing to changing life styles. As per the data collected from various companies and discussions held with officials dealing with sales on local as well as central level and inventorization carried out by SPCB during 2009-10, it is estimated that the sale of Television sets has been declining gradually with rising demand for L.C.Ds. Moreover, as conveyed through informal discussions held with President, Jammu Computer Dealers Association, IT sector has shown a sharp growth with annual turnover of Rs 225 cr. for the year 2012 as compared to 100 cr turn over during 2007 due to fast computerization of the Govt. Departments, Educational Institutions and Private companies etc. The discussions held with dealers revealed that the sale of almost all EEE gadgets is at least 10-15 % more in Srinagar as compared to Jammu region. Khattar *et al.*, (2007a) have made a forecast for the growth of PCs in 2012, with 12,571,000 units of desktops and 7,779,000 units of notebooks. By 2015 the number of households with a television is expected to have increased to 234 million from 58 million in 2007 (Khattar *et al.*, 2007b). Although the urban market for mobile phones is saturated, the continuing growth of rural usage rates will support the industry's forecasted annual growth rate of 47% (Khattar *et al.*, 2007c).

India is expected to have 11% share in the global consumer electronic market by 2015 (TATA, 2008a).

## **Research Article**

There is no E-waste recycling facility in the State.

### **Disposal Behavior**

i) *Govt. Organizations, Banks and Hospitals:* Almost all the Government organizations, Banks and Hospitals have neither formulated any E-waste disposal policy nor do they have any agreement with registered recyclers except few such as ICICI Bank, HDFC Bank, Bajaj Allianz General, Central Bank of India, Bajaj Allianz Life, ING Vyasa, Tekcare India Pvt Ltd, Intex Technology.

ii) *Households:* Quantities of E-waste generated from households is very negligible and is either passed on to relatives or friends or kept stored as such for long times as the people do not know the best way of disposal.

In India, the average lifespan of a computer has been estimated to be app. three to five years whereas the lifespan of a television, refrigerator or washing machine is ten to fifteen years (Skinner, 2010).

iii) *Service centres:* Almost all the service centres have no disposal policy in place and the waste as such is lying stored with them for many years.

However, service centres authorized by various companies send the discarded items back to respective parent companies for final disposal.

Quantities of waste generated from service centres dealing with Cell phone and Printers is negligible as most of these items are repairable and almost all parts of cell phones can be reused.

iv) *Scrap dealers / Dismantlers:* Scrap dealers play a major role in the E-waste value chain at various levels, viz., collection, segregation, dismantling and resale of separated components. In Jammu region, waste from formal (excluding companies having authorized Collection Centre) and informal service centres, consumers and Bulk consumers finds its way to unorganized sector due to easy disposal facility and lucrative prices being offered by scrap dealers.

Many refurbishes operating in informal sector mostly those providing door step service of old and out of warranty refrigerators purchase the obsolete compressors as well refrigerators from the consumers and dismantle the same at their places.

Informal sector has not taken any initiative towards formalization even after issuance of strict notices and awareness being carried out by SPCB to ensure compliance as under the Rules.

As per discussions held with scrap dealers, quantity of computers, refrigerators and Television sets being received by them has shown a considerable rise as compared to the previous year's reflecting an inclination towards rapid technology advancement and therefore waste generation.

### **E-waste Generation**

The main sources of E-waste are Government Institutions, public and private sector institutions, product & component manufacturers and individual households.

A sharp rise in E-waste generation has been found due to rise in obsolescence rate of EEE, changing life styles and availability of advanced technology gadgets at cheaper rates. The total annual E-waste generated in the State of J&K for the year 2012-13 has been found to be app. 3260.4 tons.

Per capita generation of E-waste has been estimated to be app. 0.26 Kg for the year 2012-13 which is app. 5 times higher as compared to previous data.

Globally about 15 million tonnes of E-waste is generated, of which 3.4 million tons of E-waste is produced in U.S. alone while 4 thousand tons is produced in India annually. The E-waste generated in India is growing at the rate of 10-15% (Sycom Project, 2010c). In 2012, 7.1 mn computers, 16 mn TV sets and app. 190 mn mobile handsets are expected to be a part of the E-waste pool in India. This would translate into 1 mn tons of E-waste in 2012 (TATA, 2008b).

### **Conclusion**

Rules can be enforced successfully only after the E-waste issue is well addressed at various levels and strict policy be evolved to ensure compliance as per the provisions laid under the E-waste Rules in the absence of manufacturing units and Corporate Headquarters in the State of J&K. Producers must be directed to establish an efficient collection mechanism for implementation of Extended Producer Responsibility and it should be made compulsory for all the Bulk consumers to file annual returns to SPCB regarding data on purchase, refurbishment, relocation / donation.

## **Research Article**

### **REFERENCES**

- Anonymous (2007).** E-waste Inventory Assessment Manual. Compiled by United Nations Environmental Programme, Division of Technology, Industry and Economics, International Environmental Technology Centre, Osaka/Shiga 1(DTI/0989/PA) 32, 43, 54.
- Anonymous (2011).** Jammu and Kashmir: The State Profile. *PHD Research Bureau*, PHD Chamber of Commerce and Industry, PHD House, 4/2 Sri Institutional Area, August Kranti Marg, New Delhi 11, 19.
- Anonymous (2011).** Census 2011. Provisional Population Totals. *Our census our future*, Office of the registrar general and census commissioner, Ministry of Home affairs, India (15).
- Khattar V, Kaur J, Chaturvedi A and Arora R (2007).** E-waste Assessment in India: Specific focus on Delhi: A Quantitative Understanding of Generation, Disposal & Recycling of Electronic Waste. *BIRD & GTZ* 17-20.
- Schluep Mathias (2009).** Recycling – from E-waste to resources. *Sustainable Innovation and Technology Transfer Industrial Sector Studies*, UNEP (DTI/1192/PA) 1, 45-51, 80-81.
- Sycom Projects Consultants Pvt. Ltd. (2010).** Report on Baseline study on the legal status of the profit making registered entity of the group of informal sector workers. Submitted to *Advisory services in Environment management (ASEM)*, GTZ, Gulmohar Park, New Delhi 1-4.
- Toxics Link (2004).** E-waste in Chennai Time is running out. *Toxics Link* [Online]. Available: [http://toxicslink.org/docs/06033\\_reptchen.pdf](http://toxicslink.org/docs/06033_reptchen.pdf) 310.
- TATA (2008).** *E-waste: Opportunity or Burden?* [Online] TATA Strategic Management Group. Available: <http://www.tsmg.com/download/article/E-waste%20final.pdf> [No date].