



PUNE INTERNATIONAL CENTRE

eWaste

POLICY PAPER 2016

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# Acknowledgements

ॐ सहना भवतु, सहनो भुनक्तु सहवीर्यं करवावहै !  
तेजस्वीनाधीतामस्तु माविद्विषावहै !  
ॐ शांति शांति

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This policy paper needs to be read alongwith Draft e-waste rules, 2015 developed by Environment Ministry in May 2015.

I have taken inputs from many corporate including Mahalaxmi e-Recyclers Pvt. Ltd. , COEP – Dept of Metallurgy, ASM Group of Institutes in studying existing policies at Center, State and Municipal Corporations to arrive at the conclusions.

I must also thank PIC Research Advisory Group members who took time from their busy schedule to study the paper and suggest their important inputs.

Deepak Shikarpur  
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वृक्षवल्ली आम्हा सोयरी | वनचरे... पक्षीहि आळविती

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# Executive Summary

## eWaste - A New Digital Threat to Environment

India is on its way to becoming a global IT hub and a force to reckon with. Indians have earned a great reputation for successful professionalism and entrepreneurship in the field of Global Technology revolution. Indians within the domestic market are also learning ways and means to transact day to day business as well as personal affairs using Digital technologies. India is no. 1 in the wireless revolution and tele-density of smartphones is the highest in the world. But there is a flip side to this revolution. When we use digital devices smartly, do we bother to find out what happens to the device after its useful life is over? It becomes eWaste. Anything that has a wire, a plug, a battery or runs on electricity, that you probably aren't going to use ever again comprises of Electronic Waste or eWaste. India's supremacy in IT needs to be examined with another shocking reality that India is World no. 5 in eWaste management (from Creation to Disposal).

There is yet another paradox.

Highly intellectual and knowledgeable dignitaries get involved in the invention of digital devices in a modern state-of-the-art facility. But its 'end of life' recycling is mostly handled by uneducated people (mostly child labour) in the most unsophisticated environment (slums, next to rivers).

Currently there are around 100 authorised eWaste collection centres/eWaste dismantlers and recyclers across India and just few of them are in Maharashtra. Out of the total eWaste generated only 5-10 percent is recycled and rest 90 percent is mishandled by the unorganised sector.

Due to lack of awareness in the society nobody gives any importance to its storage, disposal and recycling. Even the educated masses who are main users of electronic items have no hesitation in dumping equipments and gadgets in the wastebasket along with solid waste or they prefer selling it for a nominal monetary gain to any available scrap dealer.

Hence more than 90 percent eWaste gets mixed up with other forms of waste that are mostly solid waste and gets into hands of Kabadiwallas who decide its disposal strategy based purely on petty commercial gains. eWaste in its dormant form is not a threat to environment but its disposal in an unfriendly manner makes it a threat to human health as well as the environment.

When disposed off in landfills, no matter how secure these landfills might be, toxic chemicals from the eWaste seep into the ground. Other environment hazardous techniques are used for recycling such as open burning,

acid stripping and disposing remaining liquid in rivers. Use of such methods could mean permanent health damage to the central and peripheral nervous system, various health hazards such as seizures, retardation, kidney failures etc. of the handlers as well as the neighbouring community.

While creating this document most available literature on the legal system in India were studied and the good news is that Indian laws on this subject are quite adequate. But the implementation of the laws at all levels is the real problem area.

The awareness of disposal of eWaste is almost nil in the country.

What makes this issue more complex is the import of used Electronic items from developed countries, some with intent for real re-use and some exported with hidden agenda of dumping Waste. Higher cost of recycling in developed countries makes its export to third world countries a viable business proposition and not much has been done to regulate or ban this export or import.

One must also look at the Commerce of eWaste management and propose a solution which will benefit all stakeholders in the country. If we apply commonsense at all levels and involve non governmental bodies and Corporates to sensitise the educated urban middle class, and students, we see a ray of hope.

This policy paper has several such recommendations which if implemented can bring down unscientific and non eco-friendly Recycling to 20 percent from the existing 90 percent over the next 5 years. Main recommendations (mentioned in detail in Section 9) revolve around

1. Deregistering and banning illegal channels of recycling
2. Creating awareness and ensuring that eWaste reaches authorised recyclers (only)
3. Proposing an end-to-end commercial model of recycling (PPP) involving government, eManufacturers, corporates and recyclers

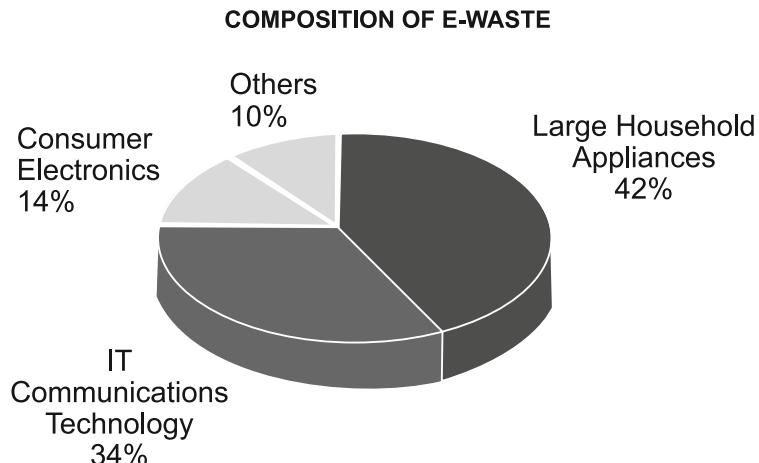
At the same time, we must appeal to the government and research agencies to innovate and propose better and alternative methods to develop processes and machinery for safe disposal of eWaste and for extracting natural resources back to their form for organized re-use.

Currently only National Metallurgical Laboratory- Jamshedpur and Center for Material Electronics-Hyderabad





# 1. What is eWaste?



**FIGURE 1**

**A**nything that has a wire, a plug, a battery or runs on electricity, that you probably aren't going to use ever again comprises of Electronic Waste or eWaste.

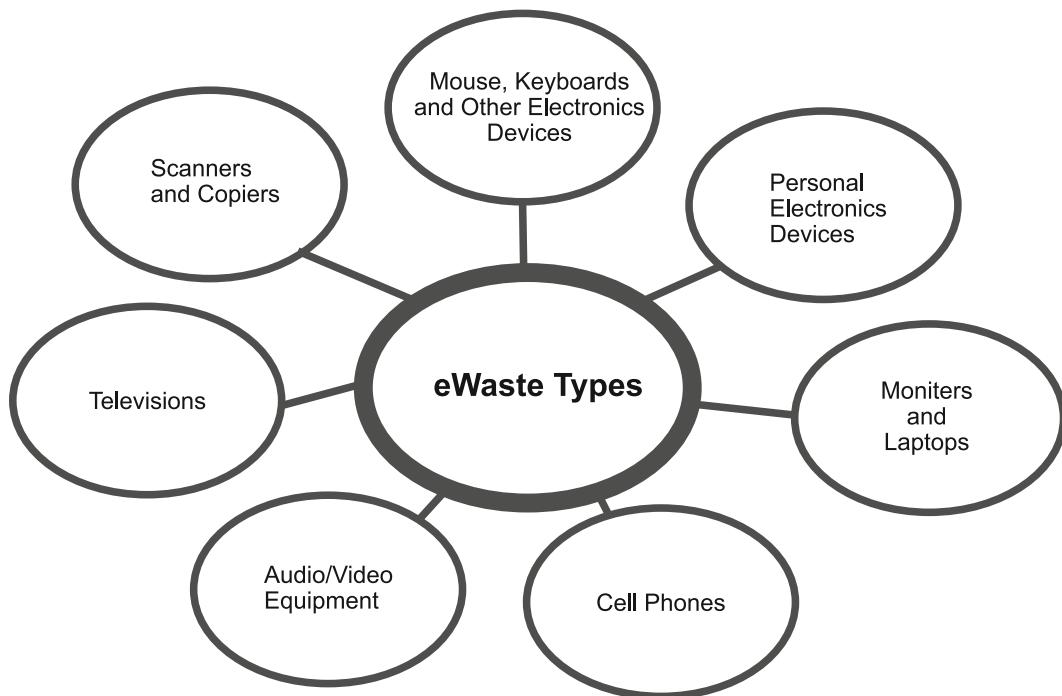
eWaste includes the broad spectrum of electronic appliances, products, components, and accessories that - due to malfunction, exhaustion (batteries, light bulbs and fluorescent tubes), or obsolescence have been discarded. It is both valuable as a source of secondary raw material, and toxic if treated and discarded improperly.

The disposal of electronics is a growing problem because electronic equipment frequently contains hazardous substances. In a personal computer, for example, there may be lead in the cathode ray tube (CRT) and soldering compound, mercury in switches and housing, and cobalt in steel components, among other equally toxic substances. Therefore when eWaste is disposed off in a landfill, it becomes a conglomeration of plastic and steel casings, circuit boards, glass tubes, wires, resistors, capacitors, fluorescent tubes, and other assorted parts and materials.

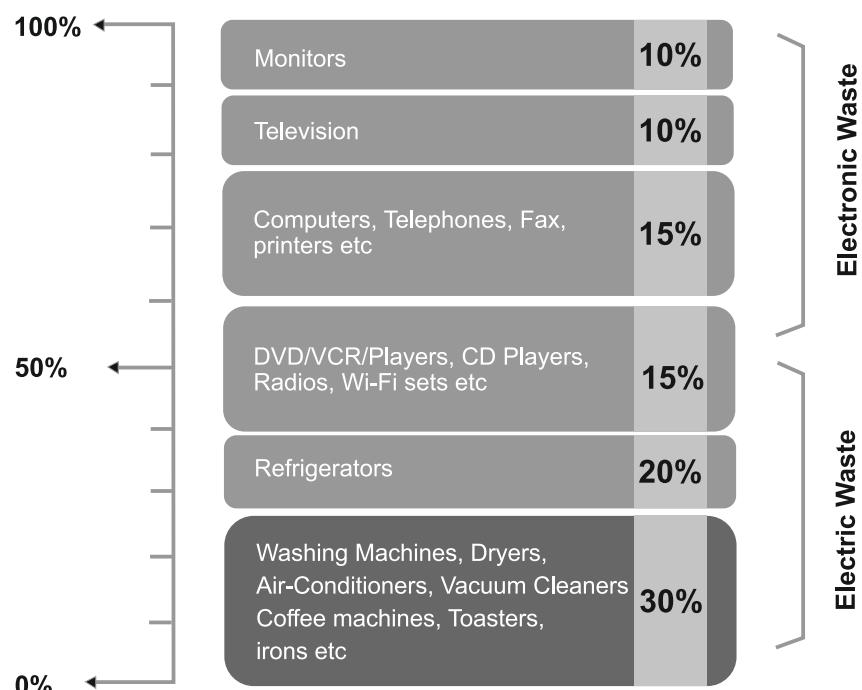
Rapid technological changes, low initial costs and even planned obsolescence have resulted in a fast growing eWaste crisis around the globe.

Due to lower environmental standards and working conditions a huge mass of eWaste is being sent to the third world countries for processing – in most cases illegally. India is no exception – ships containing eWaste are seen time and again.

## 1.1 Types of eWaste



**FIGURE 2**  
Types of eWaste



**FIGURE 3**



eWaste also includes discarded products of the types shown in Table 1.

Information and Communications Technology	Household Appliances	Entertainment and Consumer Electronics	Electrical Components	Other
Pcs, Laptops, Printers, Scanners, Monitors, Mobile Phones	Refrigerators, Freezers, Air-Conditioners, Washing machines, Dryers, Toasters, Hair dryers	Televisions, Radios, DVD players	Catalytic converters, Process Chips, Motherboards, Printed circuit boards	Alarms, Medical devices, Electrical tools, Batteries, Toys, Lighting equipment, Photocopies

TABLE 1

The percentage breakdown of discarded eWaste (based on number of units) by four main types is shown in Figure 4.

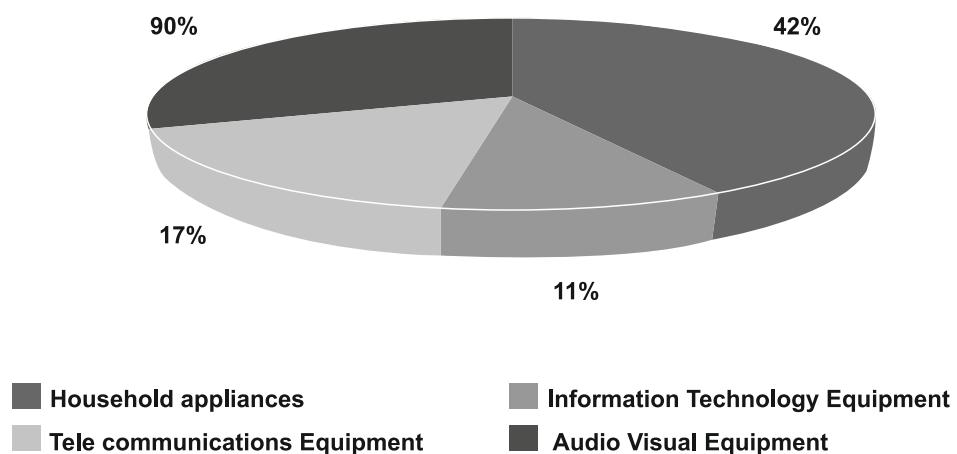


FIGURE 4

The Department of Information Technology projects the future estimate of eWaste as shown in Figure 5

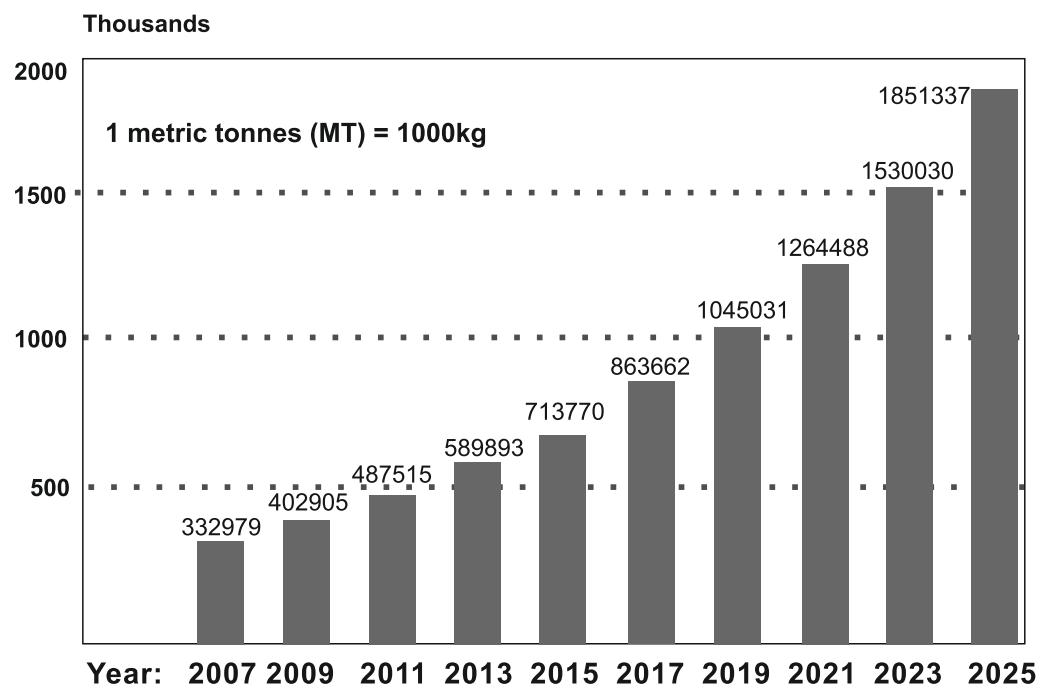


TABLE: Growth of E-waste in India

Source: Department of Information Technology

Chart: CopperBridge Media

**FIGURE 5**  
**Forecast of eWaste estimate in India**  
**Source: Department of Information Technology**



## 2. The Problem

**C**onsidering the fast spread of computer and smartphone-based technologies, it is estimated that practically everyone in the world may own an electronic communication gadget in the near future. In other words, barring babies and the very poor, everyone may carry a cellphone soon.

The current world population is about 7 billion and it is estimated that about 2.5 billion phones would be in use in 2017. The global electronics market with a total turnover close to \$1.774 trillion is the largest and fastest manufacturing industry in the world. Mobile phones, TVs, PCs, etc. account for 53 percent of the electronics industry while the rest is accounted for by embedded electronics in transport (cars, planes, trains, etc.), defence and manufacturing equipment.

A major driver of the growing eWaste problem is the short lifespan of most electronic products—less than two years for computers and cell phones. Due to rapidly evolving technology, and fast changing needs and fashions, new gadgets are purchased every 3-5 years and the old ones are discarded without much thought of what really happens to them.

Over the past two decades, the global market of Electrical and Electronic Equipment (EEE) has continued to grow exponentially, while the lifespan of the products has become shorter and shorter. Therefore, eWaste or Waste of Electrical and Electronic Equipment (WEEE) is posing a new challenge to businesses worldwide as well as to those involved in managing this waste.

Shockingly, much of this eWaste is just thrown away causing huge environmental damage! Additionally, many digital gadgets banned due to environmental reasons in developed countries are intentionally popularised in developing nations such as India.

The 'Global EWaste Monitor 2014', compiled by U.N.'s think tank United Nations University (UNU) has said that USA and China produced the most eWaste amounting to 32 Percent of the total. India was the fifth biggest producer behind USA, China, Japan and Germany, discarding 1.7 million tonnes (MT) of EEE in 2014. The report has warned that the volume of global eWaste is likely to rise by 21 per cent by 2018..

Most eWaste in the world in 2014 was generated in Asia at 16 Mt or 3.7 kg per inhabitant. The top three Asian nations with the highest eWaste generation in absolute quantities are China (6.0 Mt), Japan (2.2 Mt) and India (1.7 Mt).

While the developed world has consumed the largest share of the 1 billion PCs sold, it is the developing countries that have tended to pay the price as it is resold in India as a discounted

product.

It is an old saying (theory of Karma) “The good you do to others comes back to you” – but here we are talking about bad things, bad for you and me and worst for the future generations if corrective measures are not taken right away!!

## 2.1 Dumping eWaste into Developing Countries

Much of the electronic waste produced around the developed world – old smartphones, TVs, laptops and obsolete kitchen appliances – find their way illegally to Asia and Africa every year, says a report by the United Nations Environment Programme (UNEP).

Close to 90 percent of the world's eWaste is illegally traded or dumped each year to destinations half way across the world. While the European Union, USA and Japan are the primary origins of eWaste shipments, China, India, Malaysia and Pakistan are the main destinations, says the report. In Africa, Ghana and Nigeria are the biggest recipients of eWaste.

Such illegal trade is driven by the relatively low costs of shipment and the high costs of treatment in the developed countries. Quoting an U.S. Environmental Protection Agency study, the UNEP report says that exporting eWaste to Asia worked out 10 times cheaper than processing it in within these countries.



### 3. eWaste and Health Hazards

**e** Waste has diverse compositions that are classified as hazardous and non-hazardous categories. It contains over 1000 different substances, many of which are toxic, and creates serious pollution upon disposal.

Broadly, it consists of ferrous and non-ferrous metals, plastics, glass, wood and plywood, printed circuit boards, concrete, ceramics, rubber and other items. Iron and steel constitute about 50% of the waste, followed by plastics (21%), non- ferrous metals (13%) and other constituents.

Non-ferrous metals consist of metals like copper, aluminium and precious metals like silver, gold, platinum, palladium and so on. Due to the presence of elements like lead, mercury, arsenic, cadmium, selenium, hexavalent chromium, and flame retardants beyond threshold quantities eWaste becomes hazardous in nature

Without Safe recycling  
most of these Iodic  
components will end up  
in land fill- poisoning  
the soil and water ➔

**E-Waste Toxic Components and their Damage to Human Health**

Toxic Materials	Birth Defects	Brain Damage	Heart, Liver, Lung & Spleen Damage	Kidney Damage	Nervous/ Reproductive System Damage	Skeletal System Damage
Barium		X	X			
Cadmium	X		X	X	X	X
Lead	X	X		X	X	
Lithium	X	X	X	X	X	
Mercury	X	X	X	X		
Nickel	X		X	X	X	
Palladium	X	X	X	X		
Rhodium			X			
Sliver	X	X	X	X	X	

**FIGURE 6**  
**Health Hazards**

## 4. Disposal - Current Scenario

**O**f the total eWaste generated in India, approximately 1.5% is recycled by formal recyclers or institutional processing and recycling. Another 8% of the e-waste generated is rendered useless and goes to landfills. The remaining 90.5% of the eWaste is being handled by the un-organized sectors.

Due to lack of awareness most eWaste gets mixed with solid waste. Most of this ends up in the unauthorised sector, sold to kabadiwallahs, and gets stripped down for component parts in highly unsafe conditions.

Products are treated and processed in the majority of urban slums of the country, where untrained workers carry out the dangerous procedures without personal protective equipment, which are detrimental not only to their health but also to the environment.

The biggest eWaste recycling market in India is Delhi and approximately 40% of the eWaste in India lands here from all parts of India.



**Almost everyone is Stakeholder**

**FIGURE 7**  
**E-waste Management Stakeholder**



**FIGURE 8 & 9**  
**Manhandling of eWaste**

## 4.1 Hazardous Disposal Methods

Being highly hazardous and toxic, eWaste is highly deadly for all that is living, and all material that is life sustaining, such as land, water and air.

### DUMPING IN LANDFILLS

When disposed off in landfills, no matter how secure these landfills might be, toxic chemicals from eWaste seep into the ground. For people living in the vicinity of these landfills, it could mean permanent health damage to the central and peripheral nervous system, various health hazards such as seizures, retardation and kidney failures. It may even affect child development.

### OPEN BURNING

Toxins generated from the open burning of Plastic shells, PCB boards and other non-ferrous materials contained in eWaste pollute the air, water and ground and are a growing concern and for health authorities in and around the regions where such practices take place. Due to the presence of PVC and brominated flame retardants in wires, the emissions contain high levels of both brominated and chlorinated dioxins and furans – two of the most deadly persistent organic pollutants (POPs). Even high traces of cancer causing polycyclic aromatic hydrocarbons (PAHs) are found in the emissions and the ash of eWaste.

### ACID STRIPPING OF CHIPS

Much of the work to remove chips from circuit boards is done for the ultimate purpose of removing precious metals. This is most often done in a very primitive process using acid baths, which is normally a mixture of 25% pure nitric acid and 75% pure hydrochloric acid. The studded PCBs are dipped into the acid mixture until the PVC is separated from the chips, after which this acid is irresponsibly drained out into the nearest drain or river. Water samples tested in and around the areas where such activities are carried out have been found to have dangerously high levels of toxins for human contact, let alone human consumption.

### CRT CRACKING & DUMPING

Lead-laden monitor glass, which qualifies as a hazardous waste as per the Basel Convention is regularly dumped on land or pushed into rivers, after the copper laden yoke of the CRT monitor is extracted. This yoke is then sold to scrap metal dealers, but only at a very heavy price to the environment!

### UNFRIENDLY WORKING CONDITIONS

The illegal trade of eWaste management offers little or no protection to the people it employs. It often employs children under the ages of 15 years. Deadly fumes are inhaled during the open burning process, dumped CRTs contaminate water holes and ground water, land turns barren for



almost 100 years to come. The extreme exposure and intake of these toxins in various forms leads to numerous fatal diseases. A large number of workers are involved in crude dismantling of these electronic items for their livelihood and their health is at risk.

#### HEALTH HAZARDS FACED BY INFORMAL SECTOR WORKERS

eWaste accounts for approximately 40% of the lead and 70% of heavy metals found in landfills. These pollutants lead to ground water and air pollution and soil acidification. High and prolonged exposure to these chemicals/pollutants emitted during unsafe eWaste recycling leads to damage of nervous systems, blood systems, kidneys and brain development, respiratory disorders, skin disorders, bronchitis, lung cancer, heart, liver, and spleen damage.

About 76% of eWaste workers in India suffer from respiratory ailments like breathing difficulties, irritation, coughing, and choking. All recyclers and dismantlers suffer from breathing problems such as asthma and bronchitis.

eWaste manhandling has a detrimental effect on the respiratory, urinary and digestive systems, besides crippling immunity and causing cancer, according to a study on 'Electronic Waste Management in India,' conducted by the Associated Chambers of Commerce and Industry of India (ASSOCHAM).

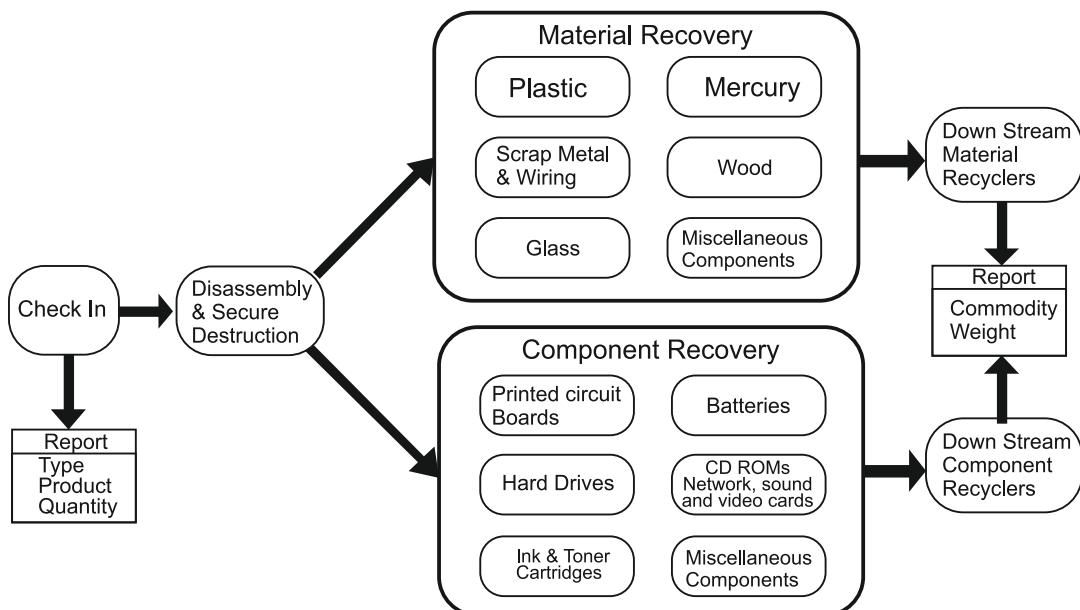
## 5. Way Out

**R**ecycling raw materials from end-of-life electronics is the most effective solution to the growing eWaste problem. Most electronic devices contain a variety of materials, including metals that can be recovered for future uses. By dismantling and providing reuse possibilities, intact natural resources are conserved and air and water pollution caused by hazardous disposal is avoided. Additionally, recycling reduces the amount of greenhouse gas emissions caused by the manufacturing of new products.

### eWaste Disposal Cycle

- Manufacture with care(ROHS complaint)
- After use segregate
- Recycle whatever we can
- Carefully Dispose remaining stuff in environment friendly manner
- Reuse

**FIGURE 10**  
eWaste Disposal Cycle



**FIGURE 11**



To obtain the highest possible result, labour intensive methods must be employed to completely disassemble and separate items into core materials and components.

#### PLASTIC

All plastics should be sent to a plastic recycler who uses the raw material to manufacture new sets of items.

#### METAL

Scrap metals should be sent to a metal recycler. Metals are placed through a shredder before magnetic systems separate the ferrous from the non-ferrous materials. The resulting product is used in the manufacture of new steel and other metal products.

#### GLASS

Cathode Ray Tube (CRT) glass, used in computer monitors and televisions, are a major issue because they incorporate many hazardous materials. Lead is the most prevalent toxic material in CRT glass; it is poisonous to the nervous system and can remain in the human body for years. Tubes in a large CRT monitor can contain up to 4 kg of lead as well as other toxic metals such as phosphor and barium. To obtain the highest environmental outcome it is necessary to send the glass to TSDF (Treatment Storage Disposal Facility) that scientifically recycles in landfills after crushing.

#### MERCURY

Mercury is commonly found within many e-waste items. Highly toxic, even in small amounts, it has been known to cause damage to the lungs, kidneys, brain, nervous and reproductive systems. Given the opportunity to mix into water and soil, it is able to be ingested by aquatic creatures and then through the food chain into our diet.

To avoid these consequences, we need to remove mercury containing devices such as tubes and lamps and forward these to TSDF where technology that captures the mercury for use in dental amalgams, separates the glass for crushing into powder and take out the phosphor powder for use in fertilizer products.

#### WOOD

Commonly found in older televisions, stereos and speakers, wood is sent to wood recycling companies who either shred it for use as mulch or use innovative technology to mix it with other waste materials for use as an alternative fuel source.

#### PRINTED CIRCUIT BOARDS

Circuit boards need to be sent to ISO 14001 (Environmental Management) accredited companies. Here they can be processed in specialised smelters to recover non renewable resources such as

copper, gold, silver, palladium and other precious metals.

### HARD DRIVES

Hard drives, in whole and shredded form, are normally sent to an aluminium foundry for processing into aluminium ingots. The majority of aluminium ingots are used within the automotive industry.

### TONER AND INK CARTRIDGES

Toner and Ink cartridges are packaged in a sealed box and should be returned to IT industry recyclers. Some will be remanufactured into new cartridges, and the remainder that can't be remanufactured will be separated into plastic and metal and returned to the recycle chain as raw materials.

### BATTERIES

Nickel Cadmium, Nickel Metal Hydride & Lithium Ion batteries need to be sent to specialised expert recyclers . The material is hulled to remove excess plastic, and then the metals placed in special smelter pots to recover cobalt, cadmium, nickel and steel for reuse in a range of areas such as battery production and stainless steel fabrication.

### CD ROMS, SOUND & MEMORY CARDS

For copyright and security reasons these products are shredded before being sent to plastic and metal recyclers.

### 1800 EWASTE, AUSTRALIA

1800 eWaste is a recycler in Australia that follows a procedure which should be adopted by all.

Most electronic waste goes through a recycling system called a WEEE (Waste Electrical and Electronic Equipment), which not only recycles 95-98%, by weight, of all eWaste that is passed through it, but ensures that any data left on hard drives and memories are thoroughly destroyed too.

- **Picking Shed** – First all the items are sorted by hand and batteries and copper are extracted for quality control.
- **Initial Size Reduction Process** – Items are shredded into pieces as small as 100mm to prepare the eWaste to be thoroughly sorted. This is also where the data destruction takes place.
- **Secondary Size Reduction** – The small debris is shaken to ensure that it is evenly spread out on the conveyor belt, before it gets broken down even more. Any dust extracted is disposed of in an environmentally friendly way.
- **Overband Magnet** – Using magnets, steel and iron are removed from the debris.
- **Metallic & Non-Metallic Content** – Aluminium, copper and brass are separated from the non-



metallic content. The metal can then be reused and resold as raw materials.

- Water Separation – Water is used to separate plastic from the glass content. Once divided all raw materials can then be resold.

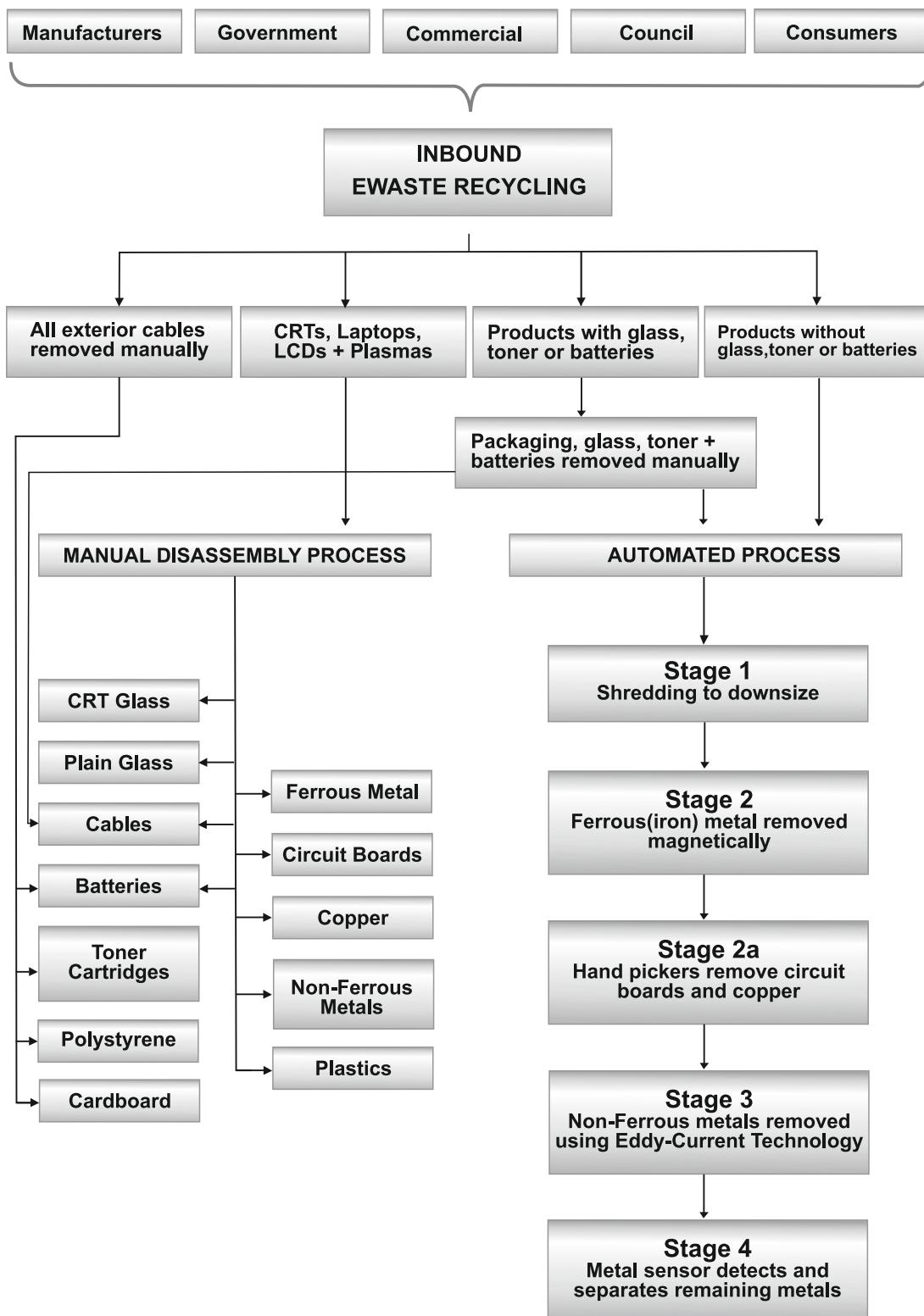


FIGURE 12

## 6. Recycled Energy

**R**ecycled energy, as it is sometimes called, is the energy saved or converted into usable products by simply handling eWaste in the right manner. Every unused electrical item contains valuable resources and energy that you are unthinkingly throwing away. Despite its common classification as a waste, disposed off electronics are a considerable category of secondary resource due to their significant suitability for direct reuse (for example, many fully functional computers and components are discarded during upgrades), refurbishing, and material recycling of its constituent raw materials. Reconceptualisation of eWaste as a resource thus pre-empts its potentially hazardous qualities.

eWaste processing systems have matured in the recent years following increased regulatory, public and commercial scrutiny. Part of this evolution has involved a greater diversion of eWaste from energy intensive, down-cycling processes (eg. conventional recycling) where equipment is reverted to a raw material form. This diversion is achieved through reuse and refurbishing. The environmental and social benefits of reuse are several: diminished demand for new products and their commensurate requirement for virgin raw materials (with their own environmental externalities not factored into the cost of the raw materials) and larger quantities of pure water and electricity for associated manufacturing, less packaging per unit, availability of technology to wider swaths of society due to greater affordability of products, and diminished use of landfills.

In a time of growing oil prices and climate change concerns, recyclable energy sources are an adequate solution and a compelling opportunity. All the energy saved helps reduce our CO<sub>2</sub> emissions and strengthen a crumbling environment.



## 7. RoHS Directive

In most developed countries, legislations and policy guidelines have been developed and established in order to control the use of hazardous chemicals in those products, and the management of eWaste. Among these, the most well known is the European Union (EU) restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) also known as Removal of Hazardous Substances Directive.

The RoHSDirective aims to restrict certain dangerous substances commonly used in EEE. RoHS regulations are designed to limit or eliminate substances that are dangerous to the environment. RoHSrestricts the use of the following six substances in manufacturing –

1. Lead (Pb)
2. Mercury (Hg)
3. Cadmium (Cd)
4. Hexavalent chromium (Cr<sub>6+</sub>)
5. Polybrominated biphenyls (PBB)
6. Polybrominateddiphenyl ether (PBDE)

Many graphic variants are available to display RoHS compliance on the product.

It is recommended that the Indian Government also develop a graphic in form of a Compulsory stickerto be used on all eProducts for its RoHS compliance like Energy star being used for Green Power saving devices such as Air conditioners/Refrigerators.

### 7.1 Non-Compliance of RoHS in Europe

Failing to make products RoHS compliant or refusing to comply with requests for documentation can result in fines that are £5000 or more. In some cases, businesses can be denied export of their products. Specific penalties vary from state to state, but non-compliance is always far more costly for a business than compliance.

EU legislation restricting the use of hazardous substances in EEE (RoHS Directive 2002/95/EC) and promoting the collection and recycling of such equipment (WEEE Directive 2002/96/EC) has been in force since February 2003. The objective of these schemes is to increase the recycling and/or re-use of such products. It also requires heavy metals such as lead, mercury, cadmium, and hexavalent chromium and flame-retardants such as polybrominated biphenyls (PBB) or polybrominateddiphenyl ethers (PBDE) to be substituted with safer alternatives.

## 8. Legislation and Regulations in India

**E**uropean Commission was the first to wake up to the eWaste menace and developed sets of guidelines and rules. The first Waste of Electrical and Electronic Equipment (WEEE) Directive (Directive 2002/96/EC) entered into force in February 2003. This was revised in 2014. The new WEEE Directive 2012/19/EU entered into force on 13 August 2012 and became effective on 14 February 2014.

A separate Directive was issued for restriction of the use of certain hazardous substances in EEE (RoHS Directive) as discussed in Chapter 7 of this report. In December 2008, the European Commission proposed to revise the Directive. The RoHS recast Directive 2011/65/EU became effective on 3 January 2013.

Many laws and regulations in other countries (including India) is influenced by European Commission laws.

### 8.1 India Scenario 2005-2012

In 2005, India's Central Pollution Control Board (CPCB) developed guidelines for the environmentally sound management of eWaste in India. The Ministry of Environment and Forest, as part of the Environmental Protection Act of India, enacted the "eWaste (Management and Handling) Rule" of 2011 that was to take effect on May 1, 2012. (Source [www.moef.nic.in/downloads/rules-and-regulations/1035e\\_eng.pdf](http://www.moef.nic.in/downloads/rules-and-regulations/1035e_eng.pdf))

These rules mandated producers to be responsible for the collection of eWaste and the financing of collection systems according to an 'extended producer responsibility' concept. The rule clearly defined the responsibilities of the producers, collection centres, consumers, or bulk consumers, dismantlers and recyclers.

eWaste dealers, refurbishers, dismantlers, recyclers, and collection centres were required to register with the relevant State Pollution Control Board (SPCB) or Pollution Control Committee (PCC). The liability on the consumer had been fixed in the form of a requirement to dispose of eWaste by taking it to authorised dealers and collection centres.

Bulk consumers were at liberty to auction their waste with the restriction that they may only auction it to authorized collection centers, dismantlers, or recyclers or to the collection services offered by the producers.



The rules assign all responsibility for ensuring enforcement to the respective SPCB or PCC. Every institution registered by the authorities has to submit an annual report to the appropriate SPCB or PCC. Manufacturers and importers of computers, mobile phones and white goods as per these rules were required to come up with eWaste collection centres or introduce 'take back' systems. 'These rules are applicable to every producer, consumer and bulk consumer involved in manufacture, sale, purchase and processing of electronic equipment or components.' The ministry grants a one-year grace period for collection centres to be set up.

## 8.2 Draft Rules 2015 for eWaste

After the new government took over at the center in 2014, discussions started about enhancing the scope of old rules and then it came up with the draft of eWaste rules, 2015, which has broadened the scope of the old rules by including several major provisions. The new draft rules lay down the responsibilities of various stakeholders in clear terms.

### 8.2.1 The Additions

Refurbishers are those who repair used EEE. In India, consumers reuse most electronic items after repairing them or by handing them down to family members, friends and acquaintances. Refurbishing usually generates a sizeable quantity of eWaste as a result of repair and assemblage of parts. The draft rules now require refurbishers to channelise the eWaste to a collection centre or to a dismantling or recycling facility.

Then there are individual dealers or firms, which buy or receive electric and electronic items from producers for bulk sale, wholesale and retail. According to the new rules, dealers have been mandated to collect eWaste in a box or a bin or else they can demarcate a deposit area. The inclusion of PROs is another welcome initiative in the draft rules. They are professional organisations authorised collectively by producers, but sometimes they also act independently or on a public-private partnership basis. PROs can take the responsibility of a group of producers for collection and channelisation of eWaste generated from the 'end of life' of their products.

Authorisation process from State Pollution Control Boards (SPCBs) or Pollution Control Committees (PCCs) have been simplified. Producers are required to seek authorisation to carry out Extended Producer Responsibility (EPR) from SPCB in case they are implementing it in a particular state or the Central Pollution Control Board (CPCB) in case of a pan-India implementation.

The draft rules have exempted collection centres from seeking any kind of authorisation and registration. It is a good initiative by the environment ministry and will allow more organisations and individuals to enter the eWaste management field. It has also been made clear that collection

centres do not require authorisation since they do not engage in any activity that can harm the environment.

Refurbishers and dealers are required to attain one-time registration from SPCBs, file annual returns and maintain records of eWaste handled. One-time registration will ease the task of SPCBs and encourage more dealers and refurbishers to be a part of the legal chain, which will make the assessment of eWaste easy.

The concept of Extended Producer Responsibility (EPR) has been enshrined in the proposed Rules. The rules propose to extend producers' responsibility to the post-consumer stage of the product life cycle and fix their responsibility for collection of 'end of life' products and to ensure that such waste is channelised properly.

Another new feature that the draft rules have incorporated is the Deposit Refund Scheme. Under this, a portion of the sale price shall be retained by the producers and be refundable to consumers once the 'end of life' products are channelised according to the prescribed methods. This Deposit is supposed to fund the cost of Recycling.

### **8.2.2 Roles of Producers, Manufacturers demarcated**

The new Draft Rules have also categorised producers and manufacturers differently for ease of understanding. Producers are manufacturers selling EEE under their own brands. They can also assemble EEE by other manufacturers or import them for sale in India.

Manufacturers are those persons, entities or organisations registered under the Companies Act, 2013 or Factory Act, 1948 who have facilities to manufacture EEE.

The producers, which also include companies who import EEE for sale in India, will now have to seek authorisation for implementing EPR. EEE manufactures will have to seek authorisation from the SPCB of the particular state where they intend to manufacture their items.

### **8.2.3 Shortcomings of Draft Rules**

- The main issue on which this legislation is silent is the status of illegal informal chain of eWaste mafia who follow no rules and use all sorts of environment unfriendly methods to recycle
- **DRS (Deposit Refund Scheme):** Under the DRS scheme, a portion of the sale price shall be retained by the producer and shall be refundable to the consumer once the end-of-life products are channelised in the prescribed methods. Such schemes have worked well in US and



European countries for plastic bottles, metal cans and motor oils. Who will be eligible for EPR authorisation—bulk or independent producers or a group of producers—needs to be clarified. Also, EPR management is missing from the draft rules.

- The concept of **PRO(Producer Responsibility Organization)** works well in developed countries where a number of organisations come together to implement take-back of eWaste financed by producers. Setting up a collection mechanism in India will be a huge challenge. If companies try to reach out to all parts of the country, it will not be economically sustainable
- Concept of making **Extended Producer Responsibility EPR** responsible for 'end of life' recycling is a good idea, but the Rules don't mention anything about the failure to comply

## 9. Recommendations

### 9.1 The Commerce of eWaste

In the current situation the unauthorised and disorganised sector is handling eWaste and they have popularised a practice of paying small sums to kabadiwallas and scrap dealers (who collect used items from consumers). Buyback options or reducing cost of new product in lieu of returning old item is a normal practice.

TSDF (Treatment Storage Disposal Facility) controlled by private players exists in some cities. These TSDF agencies charge recyclers for transport, collection etc. This at times becomes a disincentive. A model should evolve so that recyclers will be incentivised to provide more and more eWaste to TSDF.

California, home of Silicon Valley has 60 recyclers and the state law compels to pay the users and avail the eWaste recycling or disposal service. It appears difficult to establish such a model in India, but progressively we should move in that direction. Current proposal of DRS in Draft 2015 scheme is a step in that direction.

We see a ray of hope to create a win-win model on PPP basis to establish TSDF and recycling plants in many locations. Government or corporates (CSR funds) can contribute land, electronic/IT companies through their CSR and mandatory procedures will not only provide technical infrastructure but also collection of used items. Such facilities can be managed by independent and authorised entrepreneurs who will sell extracted useful material to other companies and dump remaining waste in landfills scientifically ensuring no environmental damage.

### 9.2 Central Government

Central Government (mainly Ministry of Environment) needs to play a larger role. All rules and regulations for eWaste management & handling must be made at central level and deployed/delegated at state level through local civic bodies.

- Give strategic push to eWaste Recycling as part of Swach Bharat Abhiyan (Permissible CSR) lead by Hon'ble Prime Minister appealing all citizen through tweets, speech and Man kiBaat.
- Create awareness using all channels of Public Relations viz electronic/print/social media/Radio



- Appeal all trade bodies associated with IT and Electronics industry to make eWaste as a strategic issue
- Easy classification/categorisation of all items should be done, so as to avoid ambiguity amongst the lawmakers, users and recyclers
- Recycling of eWaste by unauthorised agencies/persons should be made a crime with stringent punishments
- Make eWaste handling the sole responsibility of authorised recyclers (only)
- Simplify procedure of appointing authorised recyclers and control it centrally
- Authorised recyclers should display their transactional turnover on a monthly/quarterly basis on their website
- Purchase of eWaste by authorised recyclers from consumers/agencies and subsequent sale of useful recycled material to electronic manufacturers should be exempt from all taxes
- Make Manufacturer of electronic items responsible for its recycling after usage
- Develop a RoHS Directive and spread awareness of usage amongst consumers
- Awareness campaigns by corporates and setting up end-to-end complete recycling facility in their own industrial premises or government land should become a tax exemptible expense and permissible under CSR norms
- Appeal CBSE and ICSE Boards to include eWaste awareness as a part of School Syllabus
- All companies part of SEZ, Industrial and IT Parks to recycle eWaste completely as a mandatory compliance
- Electronic sale/service channel of digital product companies should be made responsible and accountable for collection of eWaste and its subsequent handover to authorised recyclers
- Import, assembly and manufacturing of Electronic items:
  - Regulate Import of Electronic Items and make RoHS compliance compulsory
  - Levy additional duties on manufacturing and import of non RoHS compliant products
  - Importer of old electronic items should be held responsible for its Recycling
  - Ban import of eWaste from developed countries
  - Manufacturers to dispose and recycle the eWaste generated during the manufacturing process

### 9.3 State Governments

- Space availability for recycling (preferably near solid waste management units) should be made easy
- Develop PPP model for setting up recycling plants in urban locations, MIDC properties and near solid waste management facilities. CSR funded infrastructure will be contributed by corporate sector in setting up such units

- State IT and Industrial Policy to include collection and handing over of eWaste to authorised recyclers as a mandatory responsibility
- Appeal SSC Board to include eWaste awareness as a part of School Syllabus
- Encourage schools and colleges to hold essay competitions, elocutions, rallies etc. to spread awareness

## 9.4 Local Civic Bodies

- Local bodies must implement segregation of solid, liquid and eWaste in residential societies, separately collect eWaste and not let it mix with solid waste under any circumstance
- Encourage eWaste-free wards like Zero Garbage wards
- Offer concessions in civic taxes for Housing Societies segregating eWaste in addition to solid waste and its handing over to authorised recyclers
- Collection bins preferably with separate colours and signage must be set up in ward offices, colleges, shopping malls and places of work as well as public places like station, airport, gardens etc.

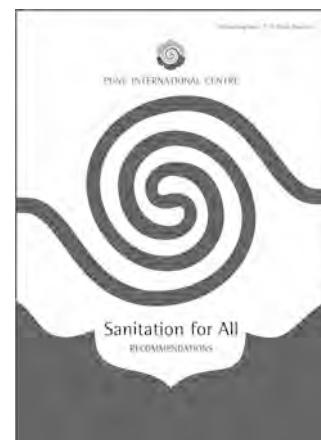


# Publications

## I. MAKING PUNE SMARTER

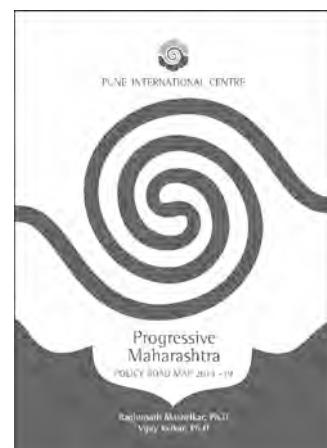
### I. SANITATION FOR ALL- RECOMMENDATIONS

The Sanitation Policy Paper takes into account the efforts of governmental and non-governmental bodies to address the issue of lack of toilets in the rural, semi-urban and urban parts of the country. It purports to provide a survey of all aspects of sanitation – use of variegated technologies for the construction and maintenance of toilets and for the disposal and recycling of waste, matters related to information, scalability of successful models, education and communication, training of personnel etc. It also gives practical recommendations for the implementation of such a policy to address the issue of open defecation & lack of toilets.



### II. PROGRESSIVE MAHARASHTRA POLICY – ROAD MAP 2014-19

The Progressive Maharashtra Policy Road Map 2014-19 report addressed the capacity and potential that the historic state of Maharashtra possesses, which has remained untapped and under utilised. The report highlighted the gaps in polity and suggested methods that could bring about strong development. Issues such as improved governance and reforms, dissemination of water resources, novelty in agricultural practices, improvement health facilities, development of tribal areas, promoting the energy scenario, improvement in the manufacturing sector and urbanization were dealt indepth in the report. Legal and economical perspectives were taken into perspective to encourage innovation and offer a fresh perspective for formidable development. The report was released during the state assembly elections in 2014 and many of the points from the report were topics of extensive debates. The report received wide appreciation and support.



### III. INNOVATING INDIA : THE ROADMAP 2014-19

In view of the Loksabha elections of 2014, PIC presented a national development agenda for the next five years to representatives of the national and state political parties. The agenda was drafted in a way that allowed for its inclusion in the manifestos of various parties before the general elections of April-May 2014. The report is a set of policy recommendations in various domains: fiscal consolidation, manufacturing, infrastructure, energy security, and foreign policy. The focus of PIC's report is on 'big implementable ideas' across various sectors that will yield positive, tangible and large development gains to the country.

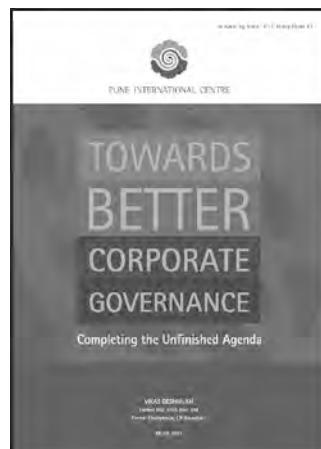
This report, written by both PIC members and domain experts, was released in New Delhi with a roundtable on 'Innovating India: The Roadmap 2014-19'. Its recommendations were discussed, debated and mutual consensus arrived at among the participants who included Members of Parliament, leaders of political parties and editors of the national media.



### IV. TOWARDS BETTER CORPORATE GOVERNANCE

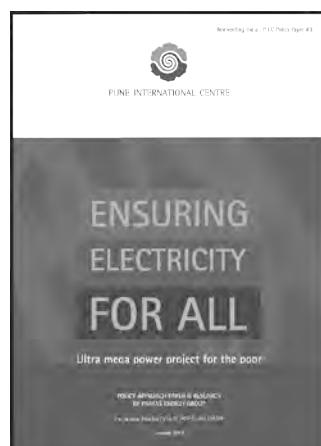
Good corporate governance is not just a 'good thing to have', it is a must for the functioning of a sound democracy. The disastrous effect of bad governance is accepted widely as the key factor in the recent downfall of western economies. While a great deal has been done to improve corporate governance in India, much more remains to be done. This paper addresses its unfinished agenda and suggests implementable solutions.

Taking into account the proceedings of PIC's round table chaired by Mr. C B. Bhawe, Former Chairman, SEBI, the paper was prepared by a team of PIC Founder Members and expert invitees. It was presented to Dr. Veerappa Moily, Former Union Minister on 26th March 2012.



### V. ENSURING ELECTRICITY FOR ALL

Prayas Energy Group and Pune International Centre (PIC) jointly organised a roundtable on "Electricity For All: Challenges and Approaches" on 18th February 2012 in Pune. Former Union Minister of Power, Shri Sushil Kumar Shinde was the chief guest while the veteran social leader Shri N. D. Patil chaired the roundtable. Dr. Pramod Deo, Chairman, CERC and Shri Ashok Lavasa, Additional Secretary, Ministry of Power was also present. The main agenda was to discuss challenges and approaches to ensure electrification for all households in India. This led to a discussion paper titled 'Ensuring Electricity For All!'. The paper argues that for ensuring electricity for all, supply is as important as providing connection. It proposes restructuring of Rajiv Gandhi Gramin Vidyutikaran Yojana (RGGVY) and making available low cost power to distribution companies to fulfil national commitment of Electricity for All.





## VI. ENERGY & ENVIRONMENT DILEMMA AND ITS IMPACT ON NATIONAL SECURITY

Climate change due to global warming and increasing demands of human society are the two major concerns which can affect global peace and stability in the future. PIC organised a round-table on the subject of 'Energy & Environment Dilemma and its Impact on National Security' on 2 August 2012 in Pune to spotlight the need to recognize the complexity of this multi-dimensional problem and to evolve a policy advisory paper which would highlight the urgent actions required to address the combined threat to national security.

The round-table discussion was attended by over 80 participants where several experts shared their well-informed views. The late former President of India, Dr. APJ Abdul Kalam addressed the final session attended by over 400 people. He discussed their impact on national security and said it was important to understand their inter-connections. He advised a 'mission-mode' approach to maximise the contribution of green and renewable energy in India with an ambitious target for 2030. Congratulating PIC for the initiative, he advised greater participation of young minds and suggested that leaders in Pune should aim at making Pune a carbon neutral city.

