

E-WASTE MANAGEMENT: A COMPARATIVE STUDY OF THE LEGAL FRAMEWORK IN INDIA AND SWITZERLAND

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ABSTRACT

Electronic waste (e-waste) has been reported to be one of the ever-increasing waste streams in the world, and experts have estimated that it will continue to grow by 3 to 4 percent annually. A recent report of 2020, found that the world produced around 53.6 million tonnes of e-waste in 2019 out of which only 17.4% was recycled and the destination of rest is unknown. E-waste management is an issue for both developed and developing countries alike. Most of the developed economies even after installing a formal e-waste management system in place are encountered with shallow collection and recycling rates. The situation is particularly worrisome for developing nations like India because of the dominance of informal sector. However, Switzerland is not only the first developed nation to implement a formal system for the collection and recycling of e-waste rather successfully managing its e-waste too for past two decades. In light of this, the paper presents a comparative legal analysis on the existing management systems of e-waste in two countries, Switzerland and India.

Keywords: *E-waste, India, management, formal sector, Switzerland, informal economy.*

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II. Current Trends related to E-waste

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I. Introduction

WE ARE living in a tech-hungry world. People have an insatiable hunger for more and more electronics to stay in trend and maintain their statuses in society. This becomes worse by the consumer oriented market further plagued by the syndrome of ‘*Obsolescence*’. Owing to these unsustainable trends around the globe, electronic waste (*hereinafter* referred as ‘e-waste’) has been reported to be one of the ever-increasing waste streams in the world, and experts have estimated that it will continue to grow by 3 to 4 percent annually.¹ A recent report of 2020, found that the world produced around 53.6 million tonnes of e-waste in 2019 out of which only

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¹ Tess Falkner-Kenny, “How e-waste is creating a growing environmental and health crisis across the world”, U.S. PIRG, May 05, 2021, available at: <https://usp.org/blogs/blog/usp/how-e-waste-creating-growing-environmental-and-health-crisis-across-world> (Last visited on May 10, 2022).

17.4% was recycled and the destination of rest is unknown.² It was assumed in the report that the rest ended up either in a landfill or was disposed of in appalling conditions.

E-waste is a very complex kind of waste in terms of its composition because of the presence of both valuable and toxic metals in it. Therefore, both kinds of metals demand an environment-friendly management of e-waste as the hazardous metals impact environment adversely if not handled properly. On the other hand, non-toxic metals are the most valuable, scarce and often rare metals. It was reported that due to presence of valuable metals “e-waste is worth at least \$62.5 billion annually, which is more than the GDP of most countries”.³ These metals are found in almost all the electronic equipment and have been reported to be moving towards extinction. Therefore, it becomes all the more necessary to recycle and reuse these metals as much as we can.

Further, developed as well as developing countries are equally struggling with the management of e-waste. Most of the developed economies even after installing a formal e-waste management system in place are encountered with quite shallow collection and recycling rates. However, Switzerland is one such developed nation which has been successfully managing its e-waste for past two decades. It even came up with its own policy and regulation standards for the management of e-waste much before European Union did.

The developing countries, nevertheless, are in a worse situation as on the one hand, they do not have the formal e-waste management system in place and on the other hand, are also receiving huge waste imports from developed nations for meagre economic gains. The situation is particularly worrisome for nations like India because earlier the reach of electronic items was limited to urban populace but now, with the advancement of technology and recent initiatives of Government⁴, rural population can also be seen following in the steps of urban population. Findings of a recent survey highlighted that ‘nearly three-fourths of the country’s villages have

² C.P. Baldé, V. Forti, et.al., “The Global E-waste Monitor 2020: Quantities, Flows, and Resources” United Nations University (UNU), International Telecommunication Union (ITU) & International Solid Waste Association (ISWA), Bonn/Geneva/Vienna (2020), available at: https://ewastemonitor.info/wp-content/uploads/2020/11/GEM_2020_def_july1_low.pdf (last visited on May 18, 2022).

³ Vaishali Dar, “The e-waste crisis: 50 million tonnes of electronic waste discarded in 2019”, *Financial Express*, April 18, 2021, available at: <https://www.financialexpress.com/lifestyle/science/the-e-waste-crisis-50-million-tonnes-of-electronic-waste-discarded-in-2019/2235015/> (Last visited on May 10, 2022).

⁴ Government of India started ‘*digital India initiative*’ in 2015. This initiative aims at digital empowerment of the nation and it also aims at bridging the digital divide gap in India by connecting rural populations with the internet.

mobile connectivity' now.⁵ This new trend has resulted in in-house production of huge quantities of e-waste in India. On one hand, government is aggressively propagating schemes to promote 'digital literacy', however, on the flip side government just seems to turn a deaf ear when it comes to the management of the ever increasing e-waste.

In light of this background, this paper presents a comparative analysis on the existing management systems of e-waste in two countries, Switzerland and India. These two countries have been chosen due to the contrasting management situations prevailing in these two countries despite being largest generators of e-waste all around the world. Switzerland has been opted for this study because it was the first country ever to execute an industry-led orderly system for the collection and recycling of e-waste. The organised system has been in operation for more than two decades and has been successful too. The Swiss system, therefore, provides the best opportunity to study the evolution of an effective e-waste management system. Additionally, Switzerland has been a consistent forerunner amongst European nations when it comes to e-waste management as it achieves beyond the set recycling targets which is further backed by a very comprehensive set of policies for the management of e-waste.

India, on the other hand, has been elected for this study as it is amongst the very few budding markets of electronic appliances and is the third largest generator of e-waste in the world.⁶ Despite huge amounts of generation, India is also encountering various challenges in managing its e-waste like inventorisation, ineffective regulations, pathetic and unsafe conditions of informal recycling, poor awareness of consumers and averseness on the part of the stakeholders to address the issue.

The objective of this study, therefore, is twofold. The first is to elucidate the existing e-waste management system and the ongoing related trends in the two countries. The second is to examine the two systems and demarcate the similarities and dissimilarities between the two systems. This will also help us to understand the approach of the two systems towards management of e-waste and what are their best practices. Thirdly, the study also aims to analyse the legal policies and regulations which are in place in these two countries. The scope of this

⁵ Ruhi Tewari, "Guess who's calling from their mobile phones — nearly three-fourths of rural India", *The Print*, January 23, 2019, available at: <https://theprint.in/india/governance/guess-whos-calling-from-their-mobile-phones-nearly-three-fourths-of-rural-india/181536/> (Last visited on May 10, 2022).

⁶ Deepali Sinha Khatriwal, *et.al.*, "A comparison of electronic waste recycling in Switzerland and in India", 25 (5) *Environmental Impact Assessment Review* 492 (2005).

comparative study is limited to the existing national systems and standards while scrutinising the social and environmental aspects within the national boundaries. Lastly, the study will also reflect on how and what needs to be done for refining the current architecture of e-waste management system in India.

II. Current Trends related to E-waste

Switzerland

Switzerland is amongst those developed economies which have *highest per capita waste production* in the world. However, due to the adopted policies on waste management, it is also amongst very few economies with the *highest recycling rates*.⁷ Environmental sustainability issues are quite crucial for the government as well as for the general public in Switzerland.⁸ The Environment Performance Index (*hereinafter referred as 'EPI'*)⁹ is a demonstration of the same fact. In the recent EPI of 2022, Switzerland was ranked 9th in the world scoring 65.9 out of 100 EPI score.¹⁰ In the 'waste management' category, Switzerland stood at 3rd among 180 countries and scored 76.4 out of 100 EPI Score.¹¹ Whereas in 2020, Switzerland stood at 3rd position scoring 81.5 out of 100 EPI Score.¹² In 'waste management' category, Switzerland scored 99 out of 100 EPI Score and secured 6th rank over 180 countries.¹³ The EPI score for 'waste management' category has only improved in past two years in Switzerland.

Further, the Global e-waste monitor 2020 reported that Switzerland, whose population is around 9 million, generated 201 KT out of which 123 KT was formally collected. This means

⁷ Benjamin Demma, "Swiss waste-management policy, a peek behind the curtains of one of the most efficient country in the world", *Solar Impulse Foundation*, September 02, 2019, available at: <https://solarimpulse.com/news/swiss-waste-management-policy-a-peek-behind-the-curtains-of-one-of-the-most-efficient-country-in-the-world#> (Last visited on May 11, 2022).

⁸ See, e.g., Switzerland was a driving force behind the 2030 Agenda and its 17 Sustainable Development Goals (SDGs).

⁹ The EPI provides data on the state of environmental health and ecosystem vitality in 180 countries. The sustainability is calculated through 32 performance indicators across 11 issue categories. In 2020, EPI for the first time added "waste management" to its issue category which was neglected for a very long time all over the world. The new "waste management metric" tracks the final destination of waste materials as a measure of the waste's direct impact on the environment.

¹⁰ Environmental Performance Index, Country Profile: Switzerland (2022), available at: <https://epi.yale.edu/epi-results/2022/country/che> (Last visited on May 11, 2022).

¹¹ *Ibid.*

¹² Zachary A. Wendling, *et al.*, Environmental Performance Index (2020), available at: <https://epi.yale.edu/downloads/epi2020report20210112.pdf> (Last visited on May 11, 2022).

¹³ The Environmental Performance Index, Country Profile: Switzerland (2020), available at: https://epi.yale.edu/sites/default/files/files/CHE_EPI2020_CP.pdf (Last visited on May 11, 2022).

that 63% of e-waste was collected out of the total amount generated. It was also reported that, Switzerland generated around 23.4 Kg e-waste per capita.¹⁴ The fact which is most important is that the remaining amount of e-waste, which does not get recycled by the formal installations, is either used as construction material or to generate energy.¹⁵ This shows that Switzerland follows and firmly believes in the concept of the ‘Zero Waste’.¹⁶

In 2018, the Switzerland’s collection rate of e-waste was around 68% which exceeded the collection target of European Union directive despite not being an EU Member State.¹⁷ The recycling rate of consumer electronics (for eg., mobile phones) in 2018 was as high as 95 percent.¹⁸ Additionally, per capita collection of e-waste in the country is more than 15 kgs. which is almost quadruple of the EU target of 4 kg/capita.¹⁹ One of the reasons for these high collection and recycling rate is the dominant presence of formal sector in Switzerland.

India

On the other hand, India, which is much larger from Switzerland geographically, has been reported to be a constant laggard and ranked poorly both in terms of EPI and generation and collection of e-waste. India has been ranked 180th in the ‘Environment performance Index’ (EPI) of 2022 scoring only 18.9 out of 100.²⁰ India has further scored 12.9 out of 100 EPI Score and secured 151th rank over 180 countries in ‘waste management’ category.²¹ In 2020, India

¹⁴ The global e-waste statistics partnership, Country sheets: Switzerland (2019), available at: <https://globalewaste.org/statistics/country/switzerland/2019/> (Last visited on May 12, 2022).

¹⁵ Lucy Spencer, “How Switzerland is winning the battle against e-waste”, *ITU News*, October 11, 2019, available at: <https://news.itu.int/how-switzerland-is-winning-the-battle-against-e-waste/> (Last visited on May 10, 2022).

¹⁶ Zero Waste International Alliance defines the term “Zero Waste” as:

“The conservation of all resources by means of responsible production, consumption, reuse, and recovery of products, packaging, and materials without burning and with no discharges to land, water, or air that threaten the environment or human health.”

¹⁷ The EU Directive on waste electrical and electronic equipment (WEEE), Directive 2012/19/EU (2012), Art. 7 - lays down the collection target. Art. 7(1) states that, “From 2019, the minimum collection rate to be achieved annually shall be 65 % of the average weight of EEE placed on the market in the three preceding years in the Member State concerned”.

¹⁸ Spenser, *supra* note 15.

¹⁹ Md Tasbirul Islam, Pablo Dias and Nazmul Huda, “Comparison of E-Waste Management in Switzerland and in Australia: A Qualitative Content Analysis”, *12 International Journal of Environment & Ecological Engineering* (2018).

²⁰ The Environmental Performance Index, Country Profile: India (2022), available at: <https://epi.yale.edu/epi-results/2022/country/ind> (Last visited on May 10, 2022).

²¹ The Environmental Performance Index, Country Profile: India (2022), available at: <https://epi.yale.edu/epi-results/2022/country/ind> (Last visited on May 10, 2022).

was ranked 168th in the ‘Environment performance Index’ (EPI)²² scoring 27.6 out of 100.²³ India further scored 16.1 out of 100 EPI Score and secured 103rd rank over 180 countries in ‘waste management’ category.²⁴ The consistent poor ranking of India at EPI makes it very clear that Indian environmental sustainability is not in a good condition. There are various reported challenges for the same like huge population, rapid pace of economic growth, inefficient regulatory framework, etc.

The Global e-waste monitor reported that India, whose population is around 1.38 billion, generated 3230 KT out of which only 30 KT was formally collected. The image below also shows us that the amount of e-waste generation is increasing every year. In the year 2019-2020, the estimated generation of e-waste in India is 10,14,961.2 tonnes for 21 types of electronic equipment. This is based on the sales data of 1380 producers.²⁵

Year	E-waste generation (million metric tonnes)
2015	1.97
2016	2.22
2017	2.53
2018	2.86
2019	3.23

Source: CSE, 2020 compiled from The Global E-waste Statistics Partnership

Image 1

Source : Centre for Science and Environment Report 2020²⁶

The global e-waste monitor shows that only 1% of e-waste was formally collected out of the total amount generated. Further, India generated around 2.4 Kg e-waste per capita.²⁷ While India’s per-capita generation is amongst the lowest in the world, India is also the third-largest generator of e-waste in the world (look at the image below). Both the facts are in quite contrast to each other.

²² *Supra* note 9.

²³ Wendling, *supra* note 12.

²⁴ The Environmental Performance Index, Country Profile: India (2020), <https://epi.yale.edu/epi-results/2020/country/ind> (Last visited on May 13, 2022).

²⁵ Atin Biswas and Siddharth Ghanshyam Singh, “E-waste Management in India: Challenges and Agenda” (Centre for Science and Environment, 2020), *available at*: <https://www.cseindia.org/e-waste-management-in-india-10593> (Last visited on May 10, 2022).

²⁶ *Ibid.*

²⁷ The global e-waste statistics partnership, Country sheets: India (2019), *available at*: <https://globalewaste.org/statistics/country/india/2019/> (Last visited on May 13, 2022).

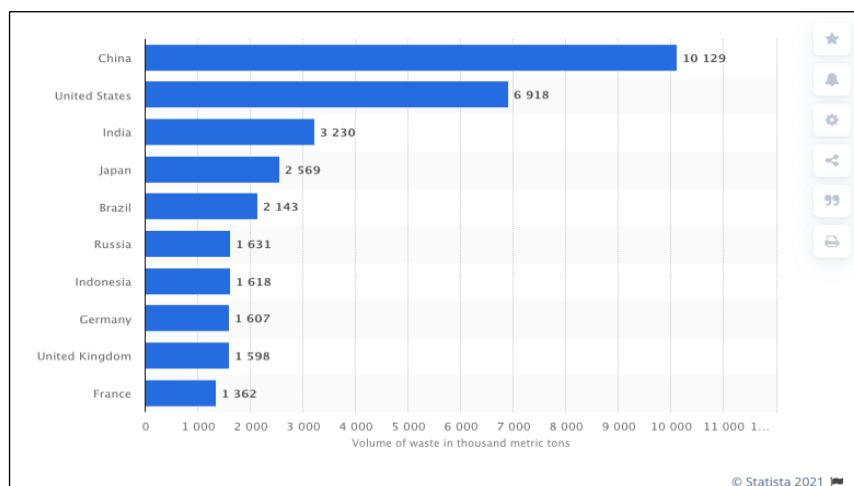


Image 2 : Top 10 e-waste generating countries in 2019²⁸

Another issue with which India is struggling is that informal and unorganised sector plays a dominant role in the management of around 95% of e-waste.²⁹ The existing informal sector processes the e-waste using ineffective technologies, primitive and makeshift methods and deficient facilities.³⁰ Further no health or environmental precaution from the virulent substances releasing into the environment through these practices are provided.³¹

The facts and data used here reflect on the similarities and differences between the two nations. The facts highlight numerous stark differences between the nations. Starting from the EPI ranks, where Switzerland has always managed to be on the top India has performed poorly year by year. Coming down to formal recycling and collection rate of e-waste, Switzerland stands at 68% and India at 1%. Lastly, in per capita generation Switzerland is way ahead of India but India has gone too far in overall generation of e-waste (owing to its large population). This comparison tells us that India's environmental sustainability is very poor in itself and in comparison with Switzerland.

²⁸ Ian Tiseo, "Global e-waste generation by major country 2019", *Statista*, March 04, 2021, available at: <https://www.statista.com/statistics/499952/ewaste-generation-worldwide-by-major-country/> (Last visited on May 14, 2022).

²⁹ Priti Banthia Mahesh and Manjusha Mukherjee, "Informal E-waste recycling in Delhi" (Toxics Link, 2019), available at: <http://www.toxicslink.org/docs/Informal%20E-waste.pdf> (Last visited on May 14, 2022).

³⁰ Sushant B. Wath, P. S. Dutt & T. Chakrabarti, "E-waste scenario in India, its management and Implications", 172 *Environmental Monitoring And Assessment* 249–262 (2011).

³¹ E-waste in India - system failure imminent - take action now!, TOXICS LINK (2004), available at: <http://toxicslink.org/Publication/ewaste-in-india-system-failure-imminent> (Last visited on May 14, 2022).

III. Legislative machinery dealing with E-waste

Switzerland

The e-waste management systems prevailing in the EU nations and Switzerland are different in nature. Additionally, Switzerland is neither a member of the EU nor of the ‘European Economic Area’ (EEA) Agreement. It is important to keep in mind the fact that Switzerland is not under an obligation to implement EU directives in its national legislation.³²

The legislations which are relevant to e-waste management in Switzerland are as follows³³ :-

- a) The Constitution of the Swiss Confederation, 1999³⁴
- b) The Environmental Protection Act (EPA), 1983³⁵
- c) The Ordinance³⁶ on Air Pollution Control (OAPC), 1985³⁷
- d) The Waters Protection Act (WPA), 1991³⁸
- e) The Ordinance on the Return, Take-Back and Disposal of Electrical and Electronic Equipment (ORDEE), 1998³⁹
- f) The Ordinance on the Movement of Waste (VeVA), 2005⁴⁰
- g) The Ordinance on the Avoidance and the Disposal of Waste (ADWO), 2015⁴¹

³² J. Ylä-Mella and E. Román, *Waste Electrical And Electronic Equipment (WEEE) Handbook* 483 – 519 (Vannessa Goodship, Ab Stevels & Jaco Huisman, 2nd ed. 2019).

³³ The legal principles of environmental protection are laid down in Acts of Parliament. In addition, the Federal Council issues ordinances, which add detail to the provisions contained in the Acts.

³⁴ It is the third and current Federal Constitution of Switzerland. It was passed on April 18, 1999 (*SR 101*). It establishes the Swiss Confederation as a Federal republic of 26 cantons (states). It replaced the prior Federal Constitution of 1874.

³⁵ This is a Federal Act of Switzerland and was passed on October 7, 1983. (*EPA; SR 814.01*).

³⁶ The ‘Ordinances’ of Switzerland have been considered like ‘Rules’ in India for this particular study. In this study author has comparatively (parallelly) analyzed them having similar nature and extent as they both are the ‘secondary legislations’ passed under ‘primary legislations’ in order to implement and administer the requirements of that ‘primary legislation’. Here, ‘primary legislations’ are The Environmental Protection Act (EPA), 1983 of Switzerland and The Environment (Protection) Act, 1986 of India.

³⁷ This ordinance was passed on December 16, 1985 (*OAPC; SR 814.318.142.1*) under the Environment Protection Act of 1983.

³⁸ This is a federal Act of Switzerland and was passed on January 24, 1991. (*WPA; SR 814.20*).

³⁹ The ordinance was passed on January 14, 1998 (*ORDEE; SR 814.620*) under Environment Protection Act of 1983 and Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, 1989.

⁴⁰ The ordinance was passed on June 22, 2005 (*VeVA; SR 814.610*) under the Environmental Protection Act of 1983, Basel Convention of 1989, OECD Council Decision C (2001) 107/FINAL of June 14, 2001 on the control of transboundary shipments of waste that are intended for recycling.

⁴¹ The ordinance was passed on Dec. 04, 2015 (*ADWO; SR 814.600*) under the Environmental Protection Act of 1983 and the Waters Protection Act of 1991.

The Federal Constitution (*SR 101*) is the supreme piece of legislation in the Swiss legal system. The constitution is considered superior and above all other federal, cantonal and communal acts, ordinances and other enactments.⁴² The Swiss Constitution recognizes in its Preamble a “*responsibility towards future generations*”.⁴³ It also aims at promoting “*Sustainable Development*”.⁴⁴ Section 4 from Chapter 2 of title 3 of the Swiss constitution deals with the “*Environment and Spatial Planning*”. Article 74 specifically talks about the protection of the environment from any damage or nuisance. The principle of “*polluter pays*” is deeply embedded in article 74 of the constitution also.⁴⁵ Further, article 76 talks about the protection of water resources from exploitation. These provisions reflect that federal constitution places a constitutional mandate of environment protection which is further implemented by various federal laws and ordinances and monitored by the cantons.

Further, Switzerland has been a pioneer in implementing first ever federally regulated e-waste management program. Switzerland has the most comprehensive waste regulation in the world. The saying “*prevention is better than cure*” is not only a dominant ideology rather a primary concept of Swiss environmental law.⁴⁶ For instance, EPA prohibits any and every kind of pollution and emission at the source only. It emphasises that any source of pollution should be eliminated at the source first as a precautionary measure.⁴⁷ Similarly, in case of waste, EPA prioritise the avoidance of waste wherever and however possible.⁴⁸ The core principles of Swiss environmental law, therefore, are precautionary principle, polluter pays principles and cooperation principle. The overall analysis of Swiss Environmental law points that the approach is more holistic in nature and focuses more on addressing the root causes of the problem. It regulates several key areas of environmental protection and contains general provisions that apply to all aspects of environmental protection.

⁴² The Swiss Parliament, Federal Constitution, *available at*: [https://www.parlament.ch/en/%C3%BCber-das-parlament/how-does-the-swiss-parliament-work/Rules-governing-parliamentary-procedures/federal-constitution#:~:text=The%20Federal%20Constitution%20\(SR%20101,may%20not%20contradict%20the%20Constitution](https://www.parlament.ch/en/%C3%BCber-das-parlament/how-does-the-swiss-parliament-work/Rules-governing-parliamentary-procedures/federal-constitution#:~:text=The%20Federal%20Constitution%20(SR%20101,may%20not%20contradict%20the%20Constitution) (Last visited on May 20, 2022).

⁴³ United Nations, Harmony with Nature, The Constitution of the Swiss Confederation, 1999, *available at*: <http://harmonywithnatureun.org/provision/iTILtx9bnOytmN82ixXKx!WE2+BITqiEqpUEqoY4FMZoj95WMcx1zoo+sj5w5G43bjxROVxgvMUMNe1lyum9Mw==> (Last visited on May 21, 2022).

⁴⁴ The Constitution of the Swiss Confederation, 1999, art. 2 cl. (2) & art. 73.

⁴⁵ *Id.* at art. 74.

⁴⁶ The Environmental Protection Act, 1983, art. 1. *See also*, Federal Office for the Environment, Swiss Environmental Law: A brief Guide (2013), *available at*: <https://www.bafu.admin.ch/bafu/en/home/topics/law/publications-studies/publications/swiss-environmental-law.html> (Last visited on May 20, 2022).

⁴⁷ The Environmental Protection Act, 1983, art. 11.

⁴⁸ *Id.*, at s. 1, art.30.

EPA is the federal umbrella legislation of Switzerland under which various ordinances have been passed including ORDEE. EPA has been developed on the lines of the constitutional mandate of environment protection. Therefore, EPA's source of origin is the federal Constitution. EPA is the bedrock of Swiss environmental law. EPA, being the parent federal legislation lays down the skeleton provisions relating to waste management. Other specific ordinances dealing with a particular category of waste are an extension of these provisions only. Chapter 4 of EPA deals with 'waste', wherein provisions focussing mainly on avoidance, recovery and disposal of waste have been enshrined.⁴⁹

EPA also lays down general guidelines in relation to waste- regarding collection, treatment, financing of disposal⁵⁰, selection of suitable sites and safe distance for the waste management facilities⁵¹, *etc.* The guidelines are very comprehensive in nature and have been established in clear words. EPA prohibits products with shorter lives and use of hazardous substances in products.⁵² The Act also prohibits burning of any kind of waste.⁵³ It puts an obligation on the cantons to remediate the landfills and other sites polluted by waste (polluted sites) if such sites lead to harmful effects or nuisances or any other risk.⁵⁴ EPA also deals with pollution of air, water and soil due to the mishandling of waste and any violations of regulations by the waste facilities.⁵⁵ However, detailed provisions and prohibitions on air and water pollution can be found in the federal Act on the Waters Protection (WPA) of 1991⁵⁶ and the Ordinance on Air Pollution Control (OAPC) of 1985.⁵⁷

EPA empowers the federal and cantonal authorities to regularly inspect and prepare reports of the installations and facilities managing waste and the impact on the environment.⁵⁸ These reports are required to be submitted to the federal authority in four years. The reports are

⁴⁹ The Environmental Protection Act, 1983, s. 1, 2.

⁵⁰ *Id.* at s. 3, art. 32 to 32b^{bis}

⁵¹ *Id.* at art. 10.

⁵² *Id.* at art. 30a.

⁵³ *Id.* at art. 30c.

⁵⁴ *Id.* at art. 32c.

⁵⁵ *Id.* at art. 7 cl. (1).

⁵⁶ The Water Protection Act protects ground and surface water from any kind of pollution and harmful effects for which various measures have been provided in detail. It also empowers the federal authorities to maintain the quality of water, remediate the waste water and dispose and treat waste water released by any waste facility and installation.

⁵⁷ Air Pollution Ordinance prohibits emissions from the installations and facilities dealing with waste. It also prohibits open-air waste incineration.

⁵⁸ The Environmental Protection Act, 1983, art. 44 & 45.

supposed to reflect on the implementation progress of provisions of EPA. Lastly, EPA empowers the federal authority to impose a cost of disposal on the producers/holder (meaning consumers) of waste.⁵⁹ This fee is decided by the federal authority and producers are made liable to bear the cost of disposal by paying the prepaid disposal fee.⁶⁰ EPA also has criminal liability and it imposes monetary penalty of not exceeding 20,000 francs⁶¹ as well as custodial detention not exceeding three years for every contravention and misdemeanour.⁶²

The other important and relevant law to deal with management of e-waste in Switzerland is “the Ordinance on the Return, Take-Back and Disposal of Electrical and Electronic Equipment” (ORDEE) of 1998. The producer responsibility take-back scheme for electronic appliances is covered by ORDEE. It is the first country to regulate the instrument based on “extended producer responsibility”. In fact, EPR was implemented well before the ORDEE came into force. The Ordinance was first passed in 1998 and later was amended in 2005. The 2005 amendment resulted in expansion of the scope of the ORDEE. It added more categories of electronic equipment to list given in Article 2 which also includes components containing capacitors in lighting.⁶³

ORDEE is a very small regulation which strictly aims at segregation of e-waste from other categories of municipal wastes and also at environmentally sound management of e-waste.⁶⁴ It is applicable on 8 broad categories of e-wastes.⁶⁵ These categories cover all sorts of electrical/electronic devices.⁶⁶ Under this ordinance, manufacturers, importers as well as retailers, are *required mandatorily* to take back, at no charge, appliances of the kind that they normally stock.⁶⁷ Consumers are also under a *mandatory obligation* to return e-waste, and are not allowed to dispose them via household waste or bulky item collections.⁶⁸ Further, ORDEE

⁵⁹ *Id.*, at art. 32.

⁶⁰ *Id.*, at art. 32a^{bis}

⁶¹ 20,000 francs = 16,14,139 Indian Rupees

⁶² The Environmental Protection Act, 1983, art. 60, 61.

⁶³ The Ordinance on the Return, Take-Back and Disposal of Electrical and Electronic Equipment, 1998, art. 2.

⁶⁴ *Id.*, at art. 1, para 1.

⁶⁵ *Id.*, at art. 2, para 1 & 2.

⁶⁶ It includes consumer electronics equipment; office, IT and communication technology equipment; household appliances; lighting equipment; lamps; tools; sport and leisure appliances as well as toys. *See also*, Wolf Ludwig, Global Information Society Watch : Switzerland (2010), *available at*: <https://www.giswatch.org/country-report/2010-icts-and-environmental-sustainability/switzerland#:~:text=In%20early%201998%2C%20Switzerland%20passed,kind%20that%20they%20normally%20stock>. (Last visited on May 10, 2022).

⁶⁷ The Ordinance on the Return, Take-Back and Disposal of Electrical and Electronic Equipment, 1998, art. 4.

⁶⁸ *Id.*, at art. 3.

also clearly distinguishes as to what components of e-waste must be recycled, disposed of and incinerated.⁶⁹ It states that hazardous substances must be disposed of separately,⁷⁰ cathode ray tubes must be recycled⁷¹ and organic chemical components must be incinerated⁷². The ordinance resembles a combined version of the European Union RoHS Directive, REACH Annex XVII Restricted Substance List, and REACH Annex XIV Authorization List.⁷³

Apart from these, two other supporting ordinances, the Ordinance on the Avoidance and the Disposal of Waste of 2015 and the Ordinance on the Movement of Waste of 2005 are also relevant. The latter ordinance ensures that the waste is handed over to the suitable and authorised disposal companies only⁷⁴ and further regulates inter and intra country traffic of waste. It also deals with the obligations of the owners towards their waste.⁷⁵

This indicates that Switzerland fulfils the regulatory objective by developing supporting policies and instrument and also by clearly defining the relationship between public and industry partners (i.e., manufacturers and importers). Additionally, in Swiss system a prepaid disposal fee is imposed on all the electronic appliances which are covered by ORDEE which is known as “advanced recycling fee” (ARF). The market price (MRP) of the electronic appliance includes this prepaid charge which is based on voluntary sectoral agreements (co-regulation).⁷⁶ However, it is imposed in only those cases where the disposal cost is higher than the value of recoverable materials.⁷⁷

Therefore, the collection service in Switzerland is free which allow consumers to return their e-waste free of charge at all collection sites. ARF is proved to be an effective financing mechanism in Switzerland covering all the operation in the management system and results in smooth operations at Producer Responsibility Organisations (PROs). The ARF rates are

⁶⁹ *Id.*, at art. 6

⁷⁰ *Id.*, at art. 6a

⁷¹ *Id.*, at art. 6b

⁷² *Id.*, at art. 6c

⁷³ Directive 2011/65, of the European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, L 174/88. *See also*, Mella, *supra* note 32.

⁷⁴ The Ordinance on the Movement of Waste, 2005, art. 1 cl. (1).

⁷⁵ *Id.*, at Chapter 2.

⁷⁶ The Environmental Protection Act, 1983, s. 3, art. 32a^{bis}

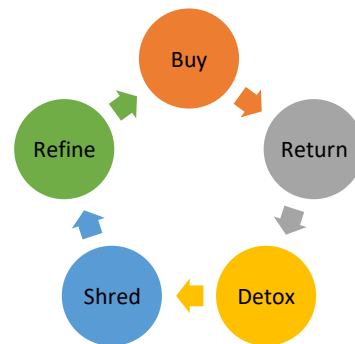
⁷⁷ Federal Office for the Environment, Electrical and electronic equipment official page, *available at*: <https://www.bafu.admin.ch/bafu/en/home/topics/waste/guide-to-waste-a-z/electrical-and-electronic-equipment.html> (Last visited on May 16, 2022).

revised annually by the ARF Committee.⁷⁸ The ARF tariff list can be easily accessed online on the official page of all PROs which is an indication of a transparent system.⁷⁹

I. Swiss model for e-waste management

The Swiss model which is used for e-waste management is also known as “Wheel of life” model. It has five steps:⁸⁰

- 1) Buy - The first step is buying of the electronic product. At this stage, an ARF is charged from consumers for the electronic item which covers finances required for safe disposal.
- 2) Return – The second step comes at the end of product’s life. At this stage, consumers are mandatorily required to return the e-waste to dedicated collection centres or to the manufacturers or importers. ORDEE imposes an obligation on the retailer to take back all kinds of e-waste free of cost. For eg., if a retailer sells computers of a particular brand even then he is under an obligation to take back computers of all brands. However, this obligation is limited. If the retailer sells only computers he is not obligated to take back refrigerators.
- 3) Detox – Third step is detox, wherein toxic elements are cautiously removed from the e-waste. This part of the process is done manually with the help of large labour and is usually non-paying. Therefore, ARF is used to cover the incurring costs.
- 4) Shred – this is the stage where remaining of the e-waste is processed mechanically. At this stage, valuable and recyclable components are removed and processed further in an environmentally sound manner.
- 5) Refine – This is the last step wherein extracted elements are refined (or reconditioned) before being sold as secondary raw materials or disposed of in a final disposal site. The refining process focuses on three main materials: metal, plastic, and glass.



⁷⁸ SENS eRecycling, Legal Framework, available at: <https://www.erecycling.ch/en/sens/rechtliches.html> (Last visited on May 10, 2022).

⁷⁹ SENS eRecycling official page, available at: <https://www.erecycling.ch/en/vrg-partner/tarife-und-geraeteliste.html> (Last visited on May 17, 2022).

⁸⁰ Shamsul Chowdhury, “E-Waste management to eliminate environmental pollution for the greater good”, 11 *Research in Business and Economics Journal* (2016).

II. Role of Formal Sector

As part of the regulatory system in Switzerland, the Swiss authorities have two main organisations “*Swiss Foundation for the Disposal of Wastes*” (also known as “SENS eRecycling”) and “*the Swiss Association for Information, Communication and Organisational Technology*” (also known as “SWICO Recycling”).⁸¹ The latter was established in 1993 and the former came into existence in 1991. Currently, these two PROs are accountable for everyday operations of the Swiss e-waste collection system.⁸² SWICO visits the collection points regularly in order to make sure they comply with environmental and occupational safety regulations. SENS supervises and monitors the recycling of household appliances, especially white goods. Whereas SWICO looks after ICT and consumer electronics, office electronics, telecommunication waste and measuring and medical instruments.⁸³ In 2018 there were 6000 collection points nationwide with over 12,000 retailers. Besides collection point retailers are also playing a significant role in the collection system of e-waste. In fact, 40 percent of the collection of e-waste comes from retailers only.⁸⁴

In 2005, one more PRO was established by the Swiss Lighting Association which is known as “*the Swiss Lighting Recycling Foundation*” (SLRS). SLRS was established to take care of discarded lamps, tube lights and luminaries.⁸⁵ These three (SWICO, SENS, SLRS) organizations handle specific categories of e-waste as described. The main goal of these organisations is to prevent electronics from reaching landfills and environmental pollution as much as possible.

The high collection rate in Switzerland, therefore, is a result of the implementation of an EPR system that employs take-back obligations without limitation. Additionally, Swiss system have established a dense network of collection centres all around the country which is backed by

⁸¹ Corning Technologies, WEEE Compliance Information for Corning Customers in Switzerland, available at: <https://www.corning.com/in/en/sustainability/articles/preservation/environmental-protection/weee-information-for-corning-customers-and-recyclers/switzerland.html> (Last visited on May 13, 2022).

⁸² SENS eRecycling, Collection points, available at: <https://www.erecycling.ch/en/entsorgungspartner/sammelstellen.html> (Last visited on May 16, 2021). See also, SWICO Recycling Report, 2018, available at: <https://indd.adobe.com/view/0e7a3d17-8b8a-441c-b393-906bacc7376e> (Last visited on May 16, 2022).

⁸³ Swiss success in e-waste collection, *The Recycler*, July 24, 2018, available at: <https://www.therecycler.com/posts/swiss-success-in-e-waste-collection/> (Last visited on May 18, 2022).

⁸⁴ Tasbirul Islam, *supra* note 19.

⁸⁵ Mella, *supra* note 32.

consumer awareness, definite obligations on retailers and ARF.⁸⁶ It has also been noted, that Switzerland’s higher collection rate is the result of the ‘financial incentive mechanism’ provided to all the collectors⁸⁷ and recyclers for the sorted collection of e-waste. This financial incentive is set reasonable high by the authorities to encourage registration. This financial incentive is set on an annual basis after giving a due consideration to the current metal scrap market prices. Through this, even the metal scrap dealers are included in the formal system and have partnerships with the country’s various collection schemes.⁸⁸

Actor	Roles and responsibilities
Governmental bodies	The federal government plays the role as overseer, framing the basic guidelines and legislation. Authorities participate in the overall controlling and monitoring of the WEEE system as a licensing authority for recyclers.
Manufacturers, importers, and Producer responsibility organizations (PROs)	Manufacturers and importers bear the economic and physical responsibilities for their products. PROs (SENS, SWICO Recycling, and SLRS) are nonprofit organizations that manage the day-to-day operations of the systems including setting recycling fees as well as licensing and auditing recyclers.
SENS	The Swiss Foundation for Waste Management, established in 1990. Its main activities are to supervise and monitor recycling of all WEEE and to take care of domestic equipment, especially white goods such as refrigerators and freezers. SENS approves WEEE treatment operators for the collecting, transporting, and recycling of WEEE. The management system is integrated in an IT database that complies with the WEEE Directive. The open database can visualize material and money flows.
SWICO Recycling	The Swiss Economic Association for the Suppliers of Information, Communication and Organizational Technology, established in 1994. It takes care of end-of-life ICT and consumer electronics from the informatics, office electronics, and telecommunication sectors as well as from the graphics and dental industries.
SLRS	The Swiss Lighting Recycling Foundation, established in 2005 to be responsible for the system of discarded lamps and luminaires.
Distributors and retailers	Distributors and retailers bear a part of the information responsibility of products. They are obligated to take back products in categories they sell irrespective of whether the product was sold by them or whether the consumer purchased a similar product in replacement. They are also responsible for monitoring the amount of ARF clearly in consumer invoices.
Consumers	Consumers are responsible and obligated by law to return discarded devices to retailers or designated collection points free of charge. They bear financial responsibility through the ARF on new products purchased.
Recyclers	Recyclers must adhere to minimum standards on emissions and take adequate safety measures concerning employees’ health. Recycling facility authorizations to operate are granted by the cantonal government and licensed by the PROs.

Image 3: Stakeholders in Swiss E-waste Management and their responsibilities (Summary)

India

The legislations dealing with e-wastes in India are –

1. The Constitution of India, 1950
2. The Indian Penal Code, 1860
3. The Water (Prevention and Control of Pollution) Act, 1974
4. The Air (Prevention and Control of Pollution) Act, 1981

⁸⁶ C.P. Baldé, *supra* note 2.

⁸⁷ *For eg.*, municipal collection points, private collectors, producers, importers, etc.

⁸⁸ C.P. Baldé, *supra* note 2.

5. The Environment (Protection) Act, 1986
6. The Electronic waste (management) Rules, 2016 r/w Draft Implementation Guidelines for E-Waste (Management) Rules⁸⁹
7. The Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.
8. The Plastic Waste (Management and Handling) Rules, 2016

In India, the Constitution places the foremost responsibilities on the state as well as individuals to protect and safeguard the environment through article 48A and 51A(g).⁹⁰ However, the environmental jurisprudence was further developed by the Judiciary through the broad interpretations of the existing environmental laws. The Supreme Court of India, interpreted article 21 of constitution and expanded it to include “right to live in a clean and healthy environment”.⁹¹ Further, higher judiciary also involved itself in the evolution and establishment of certain principles of international environmental law. The first ever principle to be evolved was principle of “strict and absolute liability in cases of hazardous or dangerous liability” under Indian environmental law.⁹² Later, in *Indian Council for Enviro-Legal Action v. Union of India*,⁹³ Supreme Court accepted the “Polluter Pays principle”. Similarly, the concept of “Sustainable Development” was enunciated and given effect to by the Supreme Court in *Vellore Citizens Welfare Forum v. Union of India*.⁹⁴ In this case, the Supreme Court also recognized the “Precautionary Principle”.

The most important legislation dealing with the management and pollution produced by electronic waste is ‘The Environment (Protection) Act, 1986’ (EPA) in which various provisions deal with the protection and improvement of environment from any kind of pollution.⁹⁵ This Act was a direct result of the first “Conference on Human Environment”, also known as “Stockholm Conference of 1972” which addressed issues concerning environment and sustainable development. EPA is an umbrella Act and the E-Waste (Management) Rules, 2016 were produced under EPA only. In chapter 2 and 3 of the Act, the central government has

⁸⁹ The Ministry of Environment & Forests, Central Pollution Control Board, Guidelines for Environmentally Sound Management of E-Waste, MoEF letter No. 23-23/2007-HSMD (Issued on Mar. 12, 2008).

⁹⁰ The Constitution of India, art. 48A & 51A, cl. (g).

⁹¹ *Subhash Kumar v. State of Bihar* (1991) 1 SCC 598.

⁹² *M.C. Mehta v. Union of India* (1986) 2 SCC 176. Also known as “*Oleum Leakage Case*”.

⁹³ *Indian Council for Enviro-legal Action v. Union of India* (1996) 3 SCC 212.

⁹⁴ *Vellore Citizens Welfare Forum v. Union of India* (1996) 5 SCC 647.

⁹⁵ The Environment (Protection) Act, 1986, Preamble of the Act.

been empowered to undertake various measures to protect and improve the quality of the environment and abate environmental pollution.⁹⁶ Section 3(2) of EPA, further empowers the central government to:

- a) lay down standards for emission or discharge of environmental pollutants from various sources⁹⁷
- b) lay down procedures and safeguards for the handling of hazardous substances⁹⁸
- c) carry out and sponsor investigations and research relating to problems of environmental pollution⁹⁹
- d) inspect any premises, plant, equipment, machinery, manufacturing or other processes, materials or substances and give such directions as it may consider necessary to take steps for the prevention, control and abatement of environmental pollution¹⁰⁰
- e) restrict areas in which any industries, operations or processes or class of industries, operations or processes shall not be carried out¹⁰¹
- f) collect and disseminate information in respect of matters relating to environmental pollution¹⁰²

Further, the penal provisions provided in EPA are directly applicable on the management of e-waste. For instance, section 15¹⁰³ of the Act deals with the liability of individuals and lays down imprisonment upto five years or fine upto one lakh rupees or with both in case of infringement. In case the violator fails to deposit the fine, additional fine can be imposed up to five thousand rupees. Similarly, section 16¹⁰⁴ deals with the liability of the companies and section 17¹⁰⁵ with the liabilities of government departments. However, section 24(2) states that if any offence is punishable under the EPA and also under any other Act, then the person shall not be liable under the EPA, 1986. This provisions, therefore, results in lesser punishment due to consideration under the specific enactments

The Central Government while exercising the powers enumerated under sections 6, 8 and 25 of the EPA first notified the “Hazardous Wastes (Management and Handling) Rules” in 1989, which were later replaced by the “Hazardous and Other Wastes (Management and Transboundary Movement) Rules” of 2016. Until e-waste management rules came into

⁹⁶ *Id.*, at s. 3(1).

⁹⁷ *Id.*, at s. 3(2)(iv) & 6 (2)(b).

⁹⁸ *Id.*, at s. 3 (2)(vii) & 6 (2)(c) & (d).

⁹⁹ *Id.*, at s. 3 (2)(ix).

¹⁰⁰ *Id.*, at s. 3 (2)(x) & 10.

¹⁰¹ *Id.*, at s. 3 (2)(v) & 6 (2)(e).

¹⁰² *Id.*, at s. 3 (2)(xii).

¹⁰³ *Id.*, at s.15.

¹⁰⁴ *Id.*, at s. 16.

¹⁰⁵ *Id.*, at s. 17.

existence in 2011 for the first time, management of e-waste was regulated by the hazardous waste management rules of 1989. In 2011, “the Electronic Waste (Management and Handling) Rules” were notified by the government which were later replaced by the current rules regulating e-waste, *i.e.*, “the Electronic Waste (Management) Rules” of 2016.

The rules are based on the principle of “Extended Producer Responsibility” (EPR).¹⁰⁶ This principle is similar to the EU WEEE directive principle of EPR. According to this principle, the producers of electronic equipment are liable for the management of the e-waste in an environmentally sound manner. The producers of e-waste are required to provide an “EPR plan”¹⁰⁷ when they apply for the EPR authorisation from the CPCB. The Guidelines by CPCB for implementing EPR suggests that, “A producer can implement its EPR either through take-back system or by setting up collection centres or both for channelization of e-waste to authorised dismantlers/recyclers”. For instance, Xiaomi India is running a ‘take-back’ program in which they accept all kinds of mobile phones, power banks, chargers, speakers, headphones, and other electronic products sold in India, irrespective of their brand.¹⁰⁸ Similar programs are run by Canon¹⁰⁹, LG¹¹⁰, etc. Producers may also have an arrangement of collection of e-waste from individual consumers and bulk consumers as well.

A clause on “Producer Responsibility Organisation” (PRO) has also been established to help the producers in the further implementation of EPR.¹¹¹ The rules emphasises on the recovery of the valuable resources from e-waste and also on recycling of e-waste with less impact on environment.¹¹² The rules also place restrictions on the use of certain toxic substances in the production of electronic appliances beyond a maximum concentration level.¹¹³ The CPCB is empowered to conduct a random sampling, if needed, to ensure compliance with ROHS.¹¹⁴

¹⁰⁶ The Electronic Waste (Management) Rules, 2016, rule 3(1)(t).

¹⁰⁷ This EPR plan includes information regarding overall scheme on how producers will achieve their targets and the mechanism they will use for collection and channelisation of e-waste. The Producers have liberty to revise their EPR Plan from time to time with prior information to CPCB. Refer, Implementation Guidelines for E-Waste (Management) Rules, 2016, chapter 2.

¹⁰⁸ MI India Product Take-Back & Recycling Program, *available at*: https://www.mi.com/in/service/recycling_guide/ (Last visited on May 18, 2022).

¹⁰⁹ Recycling at Canon India, *available at*: <https://in.canon/en/consumer/web/e-waste> (Last visited on May 18, 2022).

¹¹⁰ LG Take Back Program E-Waste Recycling, *available at*: <https://www.lg.com/in/recycling> (Last visited on May 18, 2022).

¹¹¹ *Id.*, at rule 3(1)(dd). *See also*, Central Pollution Control Board, Guidelines for Producer Responsibility Organization (Issued on May 23, 2018).

¹¹² The Ministry of Environment, *supra* note 89.

¹¹³ The Electronic Waste (Management) Rules, 2016, rule 16.

¹¹⁴ *Id.*, rule 16(9).

The aim of the provision is to produce more sustainable products which will have less impact on the human health and environment. This provision is on the lines of EU RoHS guidelines.¹¹⁵

These rules apply to every stakeholder including Producer¹¹⁶, Consumer and Bulk Consumer¹¹⁷, Manufacturer¹¹⁸, collection centres¹¹⁹, dealers¹²⁰, e-retailer¹²¹, refurbisher¹²², dismantler¹²³ and recycler¹²⁴ involved in the manufacture, sale, purchase and processing of electrical and electronic equipment, including their components, consumables, parts and spares which make the product operational.¹²⁵ The rules impose liability on all the stakeholders in case any damage is caused to the environment or third party due to improper handling and management of the e-waste.¹²⁶ The rules make it mandatory for the manufacturers, producers, recyclers and dismantlers to take authorisations from the CPCB/SPCB to run operations or facilities, to collect e-waste¹²⁷ and maintain all relevant records.¹²⁸ Currently, there are around 2140 producers of electronic equipment which have been authorised by the CPCB.¹²⁹

As per the rules, the Producers are mandated to give a pre-treatment to remove the hazardous materials and to reduce the quantity of waste before disposal.¹³⁰ Authorised producers are also supposed to meet the prescribed collection targets. The collection targets were recently revised by an amendment to the rules in 2018.¹³¹ Additionally, the Ministry of Electronics and Information Technology (MeitY) instituted an Awareness programme on e-waste which is

¹¹⁵ *Supra* note 73.

¹¹⁶ The Electronic Waste (Management) Rules, 2016, rule 3(1)(cc).

¹¹⁷ *Id.*, at rule 3(1)(h) and (c).

¹¹⁸ *Id.*, at rule 3(1)(z).

¹¹⁹ *Id.*, at rule 3(1)(e).

¹²⁰ *Id.*, at rule 3(1)(j).

¹²¹ *Id.*, at rule 3(1)(q).

¹²² *Id.*, at rule 3(1)(gg).

¹²³ *Id.*, at rule 3(1)(l).

¹²⁴ *Id.*, at rule 3(1)(ee).

¹²⁵ *Id.*, at rule 2.

¹²⁶ *Id.*, at rule 21.

¹²⁷ The e-waste should be collected either directly or through authorized agency from dealer, collection centers, Producer Responsibility Organization, through buy-back arrangement, exchange scheme, Deposit Refund System, etc.

¹²⁸ The Electronic Waste (Management) Rules, 2016, rule 4, 5.

¹²⁹ Central Pollution Control Board, List of Producers granted EPR Authorization [under E-Waste (Management) Rules, 2016], available at: <https://cpcb.nic.in/epr-authorization-status/> (Last visited on March 26, 2022).

¹³⁰ The Electronic Waste (Management) Rules, 2016, rule 5(1)(c).

¹³¹ *Id.*, at Schedule III.

known as “Swachh Digital Bharat”¹³² in 2015. This is an extension of Digital India initiative to sensitise the public about the menaces of mismanagement of e-waste.

The institutions which are mainly responsible for ensuring the compliance with the rules are divided at two levels, i.e., Centre and State. The essential functions of The Central Pollution Control Board (‘CPCB’) is to grant EPR Authorisation to the producers and revise targets of collection from time to time among others. The CPCB has to evaluate EPR applications and grant EPR authorisation within 120 days of receipt of application.¹³³ Similarly, the State Pollution Control Board is also responsible for granting authorisations to manufacturers, refurbishers, recyclers and conduct random inspections, etc.¹³⁴

In addition to the stated legislations and regulations in place, there are two more central legislations that can be brought into action in case of need. Those two legislations are – a) The Air (Prevention and Control of Pollution) Act, 1981; b) The Water (Prevention and Control of Pollution) Act, 1974. These Acts were brought in place to provide for the prevention, control and abatement of air and water pollution. It has been established in various reports¹³⁵ that informal recycling and improper dismantling of e-waste results into air and water pollution, hence these laws become quite relevant. These were also brought into existence as to fulfil the responsibilities raised in the first ever “The United Nations Conference on the Human Environment” (UNCHE), 1972, also known as “the Stockholm Conference”. The scheme of these two acts is very similar to that of EPA.

The penal provisions in the Air Act are section 37, 38, 39, 40 and 41 which are to be read with section 21, 22 and 31A. Section 37, 38 and 39 states the liability of individuals and lays down penalties for the violating section 21, 22 and 31A of the Act. Whereas Section 40 deals with

¹³² The Ministry of Electronics and Information Technology, Awareness Program on Environmental Hazards of Electronic Waste through Digital India Initiative, 2015, *available at*: <https://meity.gov.in/writereaddata/files/RFP-modified.pdf> (Last visited on Apr. 14, 2022).

¹³³ Refer Procedures for Evaluation of Application for Grant, Renewal and Refusal of Extended Producer Responsibility (EPR) Authorisation under E- Waste (Management) Rules, 2016, *available at*: https://www.cpcb.nic.in/uploads/Projects/E-Waste/Approved_revised_SoP_EPR-ewaste_21.03.2018.pdf (Last visited on Apr. 14, 2022).

¹³⁴ Refer Rule 13 and Schedule IV of E-waste Rules of 2016 for detailed information on the roles and responsibilities of CPCB and SPCB. Also refer Frequently Asked Questions (FAQ) under E-Waste (Management) Rules, 2016 by CPCB, *available at*: <https://cpcb.nic.in/uploads/Projects/E-Waste/FAQ-WM-3.pdf> (Last visited on March 26, 2022).

¹³⁵ Eric Williams, Ramzy Kahhat & Braden Allenby, “Environmental, Social and Economic implications of Global Reuse and Recycling of Personal Computers”, 42 *Environmental Science and Technology* 6446-54 (2008).

liability of the companies and section 41 with liability of the government departments. Section 37 imposes imprisonment ranging from one year and six months to six years and fine in case of violations. This fine can extend upto five thousand rupees if violators fails to deposit the earlier imposed fine. The maximum punishment prescribed under section 37 is two to seven years of imprisonment and fine.

Similarly, the penal provisions in the Water Act are section 41, 42, 43, 44, 45 A, 47 and 48 which are to be read with section 20(2), 20 (3), 24, 26, 32(1)(c), 33(2) and 33 A. Section 41 provides for imprisonment for upto three months or with fine upto ten thousand rupees. The maximum punishment under the Water Act ranges from imprisonment for two to six years.

Section 37 of the Air Act, 1981¹³⁶ and section 41 of Water Act, 1974¹³⁷ are the most important penal provisions and are based on the same footing as the provision relating to penalty has been provided in section 15 of the Environment (Protection) Act, 1986. These provisions have an inferred application as mishandling of the e-wastes result in the degradation and contamination of the Air as well as Water.

Similar penal provisions can be found in chapter XIV¹³⁸ of Indian Penal Code. Chapter XIV specifically deals with environmental pollution offences which are equally applicable to cases of pollution by e-wastes also. The relevant provisions are - sections 268, 269, 270, 277, 278, 284 and 290. Section 268 of IPC deals with “Public Nuisance” and covers pollution of land, water, air, noise pollution, *etc.* This provision is equally applicable by definition to the cases of pollution produced by improper management of e-waste. However, IPC is different from the environmental laws as a violation of a provision of IPC is cognizable which gives power to the police officers to take an action voluntarily. It authorizes individuals also to file an FIR in case of infringement of any of the provisions.

I. Role of formal and Informal sector

In India, e-waste recycling primarily involves two stages—manual collection, sorting, separating and dismantling which is followed by mechanical processing which involves

¹³⁶ The Air (Prevention and Control of Pollution) Act, 1981, s. 37

¹³⁷ The Water (Prevention and Control of Pollution) Act, 1974, s. 41

¹³⁸ The Indian Penal Code, 1860, chapter XIV.

shredding, grinding, etc. The functions of the recyclers include dismantling along with recovery operation. Recovered materials are sent to relevant facilities for further treatment and recovery of resources and materials. The recyclers have been permitted to dispose off all the unrecoverable wastes from the treatment site, to a Treatment, Storage, and Disposal Facility (TSDF).¹³⁹ But there are reported leakages in the system. At times, the e-waste directly lands at the informal markets from the formal market which includes authorised recyclers/dismantlers, producers, consumers, etc. The image below explains it in detail.

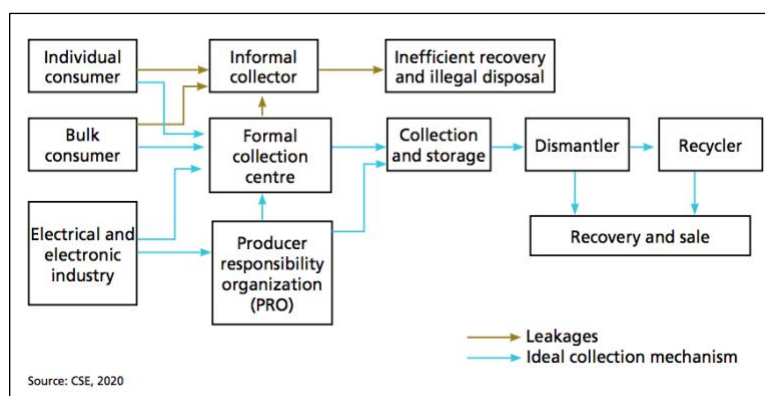


Image 4 : Ideal Collection flow of and leakages in e-waste management in India¹⁴⁰

Therefore, it is safe to assume that India has an amalgamation of both systems. However, informal sector is in dominance due to its long and old presence. This dominance has been reflected in various international reports as well. Formal sector is still in its infancy. According to GEM 2020, India formally recycles only 1% of its e-waste.¹⁴¹

Currently, there are total 77 PROs which are registered with Central Pollution Control Board (*hereinafter referred as 'CPCB'*).¹⁴² Further, it has been updated by the central authority CPCB, that around 472 recyclers and dismantlers have also been authorised from all over the country by State Pollution Control Boards (*hereinafter referred as 'SPCB'*) to manage e-

¹³⁹ The Ministry of Environment and Forests, ENVIS Centre on Control of Pollution Water, Air and Noise, Treatment, Storage, and Disposal Facilities (TSDFs), *available at*: <http://cpcbenvvis.nic.in/tsdf.html#> (Last visited on March 24, 2022).

¹⁴⁰ Biswas, *supra* note 25.

¹⁴¹ C.P. Baldè, *supra* note 2.

¹⁴² The Central Pollution Control Board, List of Registered PRO, *available at*: <https://cpcb.nic.in/list-of-registered-pro/> (Last visited on March 26, 2022).

waste.¹⁴³ The authorised recyclers and dismantlers have a combined processing capacity of 1426685.22 metric tonnes per annum (mTA).¹⁴⁴ However, there are few states which still have lowest numbers of authorised recyclers/dismantlers, *for eg.*, Assam (only 1), Chhattisgarh (only 2), Himachal Pradesh (only 2), Jharkhand (only 2), Madhya Pradesh (only 2), *etc.* The states which have highest numbers are Maharashtra (116), Uttar Pradesh (89) and Karnataka (71). Further, there are states which are yet to establish authorised recyclers like Arunachal Pradesh, Bihar, Manipur, Meghalaya, Nagaland, Sikkim, *etc.* However, the number of authorised recycling units in India is increasing. (Refer Image 5 below).

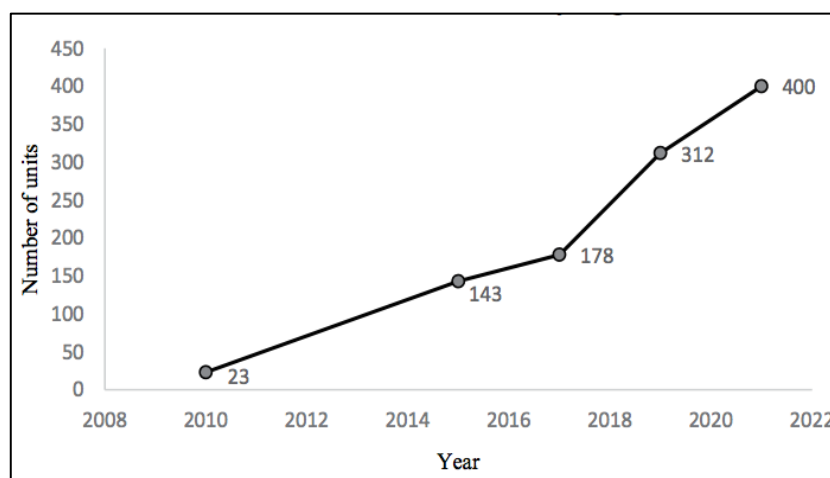


Image 5: Number of Authorised recycling units in India¹⁴⁵

Global e-waste monitor highlights that more than 90 per cent of the country's e-waste is handled by the informal sector that employs incorrect and detrimental methods to mine valuable resources from e-waste and later dump the remaining waste carelessly. This not only jeopardizes the health of the informal workers rather endangers the safety and well-being of the general public as well as the environment.¹⁴⁶ Further, it has also been reported that many children between the age of 10-14 are engaged in various e-waste activities and that too without adequate protection and safeguards.

¹⁴³ The Central Pollution Control Board, List of all the Authorized Recyclers and Dismantlers, *available at*: https://cpcb.nic.in/uploads/Projects/E-Waste/List_of_E-waste_Recycler.pdf (Last visited on March 24, 2022).

¹⁴⁴ Biswas, *supra* note 25, at 35.

¹⁴⁵ Varsha Bhagat Ganguly, *E-waste Management: Challenges and Opportunities in India* (Routledge, 1st edn., 2022).

¹⁴⁶ *Id.*, at 37.

IV. Comparative Legal Analysis

The Swiss constitution is very deeply embedded with environmental sustainability principles in comparison to Indian constitution. Swiss constitution has been concerned with environmental sustainability issues from the very beginning. Whereas, in Indian Constitution there is a very limited perspective of environmental protection, which itself was also added much later due to the pressure at various international platforms. In fact, none of the legislations talk about the principles of sustainability in clear words. The principles were rather interpreted and established by the higher judiciary in the jurisprudence of the environment. It can be, therefore, said that the approach of Indian constitution and other environmental laws is quite anthropocentric in nature.

Secondly, Switzerland was the first country to come up with the EPR principle and started managing its e-waste in 1991 much before EU itself came up with e-waste management rules. This is an evidence that Switzerland as well as its people are very much committed and aware about the sustainability of their environment. Whereas in India, the concept of e-waste management came very late and could still be seen as struggling. EPI index and related facts and data are very much an affirmation of the same. However, both legislations of India as well as Switzerland on e-waste are quite similar to that of EU Directive on WEEE. The reason for the same is that European Union's directive was developed later on lines of Swiss law and India developed on EU directive.

The other differences that can be spotted in both legislations are that, in Swiss system, prevention is really the point of focus. One can easily point out that Switzerland strongly emphasises on elimination at source, prevention and avoidance. In fact one separate piece of ordinance deals specifically with avoidance of waste. Therefore, approach is more holistic in nature and attention is more on the root cause of the problem. Whereas in India attention is more on management which comes post generation of e-waste. However, other establishments are very similar like PROs could be seen in both nations. Similarly, both nations have EPR in place to deal with e-waste management. The steps of Swiss model (Wheel of Life model) could also be seen in India's rules.

There are, on the other hand, numerous similarities between the legislative machinery of two nations. Starting from the structure of the legislative machinery. Both nations have a federal

law in place which is backed by ordinances and rules for specific environmental issues. Additionally, one common trait in legislations of both nations is of comprehensiveness. India as well as Switzerland has a very comprehensive set of legislations to deal with e-waste management. The only difference that lies between the two is, in case of Switzerland, the federal EPA has all the general provisions on waste management. Meaning thereby, waste management in general has been dealt in detail which covers up for all categories of waste even if there is no regulation for one. Whereas, In India, we have EPA which does not talk about general waste management and only empowers the central government to establish rules for the management of any kind of waste. This is one of the drawbacks of EPA, as with technology, government can't foresee which new category would emerge. Therefore, for every emerging category of waste, Indian Government will be forced to legislate new regulation.

Further, there are few areas which Indian set of legislations have not included. Indian legislation does not deal with any kind of financial incentives for the stakeholders. Further, it does not talk about the 'prepaid disposal fee' which is also known as 'advanced recycling fee' in Switzerland. This fee is not covered in Indian e-waste rules which help Swiss system to cover up their finances for recycling. Secondly, e-waste rules of India, do not deal with the selection of suitable sites for the facilities which manage e-waste. In Switzerland these sites are chosen and allotted very carefully after examining their impact on the surrounding environment. Additionally, these sites are allotted while maintaining a safe distance from the residential areas. Indian authorities do not take any such parameter in concern for the land allotment as legislation is silent on this area. Thirdly, Indian legislation doesn't express any concern about the polluted sites or landfills that could be harmful for the environment. Whereas in Switzerland, remediation of sites is taken very seriously and the polluter is liable to pay for the cleaning of the same. Fourthly, Swiss system focuses more on segregation of e-waste from municipal waste but Indian system is silent on that and in practice also waste segregation is still not as much a part of the system. Fifthly, Swiss system imposes restrictions on movement of e-waste both inter and intra country. However, in India the e-waste rules are silent regarding the provision of import and export of e-waste. A mention could be traced in the Hazardous Waste Management Rules, 2016 regarding the partial ban placed on transboundary movement of hazardous waste which includes e-waste. As per HWM Rules, import is permissible for only for the purposes of recycling, recovery and reuse.¹⁴⁷ Sixthly, the obligation on owners are very

¹⁴⁷ Refer Chapter 3 of the Hazardous and other Wastes (Management & Transboundary Movement) Rules, 2016.

well defined and strict in Swiss system but in India focus is more on other stakeholders even when consumer behaviour is a bigger problem in India which needs an immediate attention. Lastly, the management sector is all formal and organised in Switzerland but in India the majority of e-waste still goes to the informal sector. Even though there are many authorised recyclers, dismantlers and PROs are there. Yet, there are many leakages within the Indian System through which Indian e-waste reaches effortlessly to the informal markets.

Owing to these setbacks in Indian system, the environmental quality is deteriorating at a very fast pace. Evidently, there seems to be a huge gap between the practices recommended in the regulations and the actual practices on ground level in the unorganised sector in India.

V. From Here to Where?

The Switzerland model for e-waste management is definitely a successful one in comparison to India. In fact, Switzerland started managing e-waste much earlier than India did and many developed countries as well. Further, India and Switzerland both have very comprehensive set of legislations in place. Despite this India is lacking way behind for so many reasons –

- a) Environmental laws dealing with e-wastes are weak, lenient, hard to impose, and unlikely to affect ‘business as usual’ in India;
- b) upgradation of the informal sector to reach environmentally acceptable operations is presently missing, and is not part of the rules even when majority of e-waste is being managed by them;
- c) the administrative responsibilities have been dumped on the pollution control boards which are already overburdened with the administration of other environment legislations;
- d) the codification of the e-waste rules is lenient in terms of compliance mechanism. The low number of complaints regarding environmental issue are evidence of the same. As per a little survey done by author’s another research paper,¹⁴⁸ around 400 cases were scanned which were filed under above stated provisions. Out of these 400 cases only 8 to 10 complaints¹⁴⁹ have been filed under the above-mentioned provisions for environment related issues. This essentially indicates that environmental matters aren’t taken as seriously as other offences are. Reasons behind this low rate of complaints are unawareness about the law and impact on

¹⁴⁸ Nivedita Chaudhary, “E-waste in India : A study of penal issues”, Winter Issue *Indian Law Institute Law Review* 18 (2018).

¹⁴⁹ *Id.*, at 19.

environment due to the pollution caused by mishandling of e-waste. This also shows the level of commitment towards environmental sustainability.

e) the domestic legislation is not in conformity with the international law on e-waste management as it is silent regarding the ban placed on import and export of e-waste and can only be inferred from Hazardous Waste Rules;

f) the legislative machinery has been developed from the perspective of fundamental duties and not from the perspective of fundamental rights. In the absence of the same, individuals who have been harmed or injured due to the toxics released from e-waste remain helpless as there is no reference to individual complaint mechanism in the rules. Resultantly, the existing regulatory machinery is inadequate as it has not been developed through a systematic and participatory approach.

The Swiss model seems to work well for Switzerland in protecting the environment against harmful effects of e-waste. However, the same technology might not be equally efficient in Indian scenario because technological solutions are not culturally neutral in nature. For the technology to be effective in India it must adapt to local circumstances. Secondly, the provision of ARF is also not a good alternative for developing countries like India. As nations like India are already facing issues like digital illiteracy. Indian government is running schemes like “digital India initiative” to bridge this gap and measures like ARF might result in a setback for this initiative. Therefore, there is a need to address this (ARF) issue from a global perspective.

Moreover, the Swiss model bypasses the alternatives like refurbishing and reusing old electronics before dumping them completely. Again such a model can work in a fully developed and strong economy but same cannot be applied to developing nations like India where second-hand markets are thriving and are more economical also. Refurbished electronic equipment provide saleable goods in second-hand markets. Such items are in great demand due to the availability at lower prices to people with lower income. These markets, therefore, help in bridging the “digital divide” gap. Further, the revenue generated through these refurbished products can be used to cover the recycling expenses. This will save consumers from ARF. Hence, “refurbish” and “reuse” should be integrated as additional steps into the Wheel of Life

model.¹⁵⁰ These additions will result in a more flexible framework on e-waste management for developing nations like India.

Further, accumulation of complete data and analysis of the same can help Indian government in understanding the deficiencies of the system. Data analysis can help in identifying best practices, identifying and prioritizing problems, clear dialogue with the key stakeholders, maximizing the return on environmental investments. In the absence of data and other information, decision makers and other stakeholders lack the context for crafting policies, tracking the effectiveness of those policies, and adapting and learning from their own experience and the experience of others.¹⁵¹ Indian officials must immediately pay attention to these issues. This will also bring more transparency in the other related processes.

Apart from this, government must also pay attention towards awareness generation amongst the consumers as well as all other stakeholders who are part of this process. Currently, consumers as well as other stakeholders have a bleak knowledge about the harmful effects of e-waste. This can help in segregation of waste at the point of production only. Such awareness campaigns will induce communities towards protection of environment against the harmful effects of e-waste. Consequently, good governance inclusive of active press, commitment to the rule of law and just enforcement of law can make India land in top-tier EPI scores.¹⁵²

The current Indian legislations should also recognise the informal sectors and must work to coordinate between formal and informal sector. Informal sector, having such a huge work force, can be used well for the management of e-waste under supervision of formal and organised sector. Further, the capacity of the existing authorised recyclers and PROs should be increased so that they can manage as much e-waste as possible.

India, therefore, can adopt few 'convenient' best practices followed by Switzerland. Few of those practices are good coordination amongst all key stakeholders involved in e-waste management, monitor and control of all processes along with stakeholders, establish proper infrastructure for collection and management of e-waste, devoted and independent agency to

¹⁵⁰ Shamsul Chowdhury, "E-Waste management to eliminate environmental pollution for the greater good", 11 *Research in Business and Economics Journal* (2016).

¹⁵¹ Wendling, *supra* note 12.

¹⁵² *Ibid.*

oversee and coordinate the e-waste management, etc.¹⁵³ Independent unit is required to look after the e-waste management for two reasons mainly; firstly, the existing agencies like CPCBs and SPCBs are already too over-burdened with other issues relating to environment, secondly, huge number of stakeholders are involved in the management of e-waste which makes it difficult to monitor and control the processes and stakeholders.

¹⁵³ Karishma Chaudhary and Prem Vrat, “Case study analysis of e-waste management systems in Germany, Switzerland, Japan and India: A RADAR chart approach”, 25(9) *Benchmarking: An International Journal* 3519-3540 (2018).