solving the e-waste problem

Guiding Principles to Develop E-waste Management Systems and Legislation

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Guiding principles to develop e-waste management systems and legislation

The following guiding principles resulted from the compilation of a SWOT analysis of 13 existing e-waste management systems and pieces of legislation enacted in various regions of the world. The principles were conceived following an analysis of strengths, opportunities and threats, of existing systems and legislation, considering common patterns and loopholes, highlighting what currently works well and what needs to be improved.

These principles are intended to provide guidance to all stakeholders in developing countries developing solutions for e-waste management. As the input of the project is mainly based on e-waste systems in developing countries, the recommendations will best apply to developing countries, while most will hold true for developed countries as well.

Knowing that no one-size-fits-all solution exists, these recommendations are guiding elements that should be tailored and implemented taking local conditions into account.

1. **Establish a clear legal framework for e-waste collection and recycling**
2. **Introduce extended producer responsibility to ensure producers finance the collection and recycling of e-waste.**
3. **Enforce legislation for all stakeholders and strengthen monitoring and compliance mechanisms across the country to ensure a level playing field.**
4. **Create favorable investment condi-tions for experienced recyclers to bring the required technical expertise to the country.**
5. **Create a licensing system or encour-age certification via international standards for collection and recycling.**
6. **If an informal collection system exists, use it to collect e-waste, and ensure e-waste is sent to licensed recyclers through incentives.**
7. **When no local end-processing facilities exist for an e-waste fraction, ensure good and easy access to international licensed treatment facilities.**
8. **Ensure that costs to run the system are transparent and stimulate competition in the collection and recycling system to drive cost effectiveness.**
9. **Ensure that all stakeholders involved in e-waste collection and recycling are aware of the potential impacts on the environment and human health as well as possible approaches to the environmentally sound treatment of e-waste.**
10. **Create awareness on the environmental benefits of recycling among consumers.**

1. Establish a clear legal framework for e-waste collection and recycling

Implementing legislation is a critical step in the process of setting up an e-waste collection and recycling system. Not all stakeholders may be willing to voluntarily start collecting and recycling e-waste, so the definition, role and obligations of each stakeholder need to be clearly laid out in the legislation. At a minimum, e-waste legislation must include the following elements:

- A clear definition of the role of the local municipality and the national government;
- A clear definition of who is responsible for organizing the collection and recycling;
- A clear definition of who is responsible for financing the e-waste collection and recycling;
- National alignment on definitions of e-waste;
- A permitting and licensing structure for e-waste collectors and recyclers;
- A clear definition of "producer", if the system is based on the so-called "extended producer responsibility" (EPR) principle. Without this, no company will feel obliged to comply, and the fair enforcement of legal provisions across Industry will be more difficult (see Principle 2);
- Allocation of collection and recycling obligations between producers: legislation needs to describe how the obligations will be divided among all companies; it must describe how a producer knows how much e-waste it needs to collect and recycle. For instance, market share of sales can be used to determine how much of the total waste needs to be attributed to one producer and recycled (e.g, a 10 per cent market share of sales would mean 10 per cent of the e-waste needs to be collected and recycled by one producer). It can also be decided that recycling fees should be paid for each product placed on the market.
- A description of how companies shall register as "producers" and document their compliance status to ensure that the legislation can be enforced;
- A clear description of the goals and targets of the legislation, so it is possible to assess whether or not stakeholders are compliant; and
- An inclusion of the licensing and/or certification of e-waste collection and recycling facilities when relevant for licensing and operating industrial facilities.

2. Introduce extended producer responsibility to ensure producers finance the collection and recycling of e-waste

The EPR principle refers to an environmental policy approach that extends the producer's responsibility to the post-consumer stage of a product's lifecycle. EPR policies are expected to incentivize product design that encourages reuse and recycling. Under EPR, producers are the main stakeholders responsible for the entire life cycle of a product, including its end-of-life stage.

This general approach to waste management has been introduced in multiple countries to ensure the financing of waste collection and recycling. The widely accepted method is

also applicable in dealing with e-waste; it has proven effective in achieving high recycling rates when implemented.

EPR programmes involve three types of instruments:

- *Administrative instruments:* For instance, it is required that producers finance product take-back programmes and/or impose substance and landfill restrictions;
- *Economic instruments:* An example of this is the requirement for financing waste management costs (including collection and recycling) through taxes or a centralized fee structure; and
- *Informative instruments:* Governments may require producers to report to relevant authorities and place specific consumer information on products.

As described in Principle 1, it is very important to have a clear definition of who is considered to be the producer of a product. The following definition of the term "producer" is recommended:

The local manufacturer or importer of new and used electrical and electronic equipment (EEE) to be placed on a national market at first invoice by sale or donation. The producer can be a legal or natural person and must be established in the country of import.

3. Enforce legislation for all stakeholders, and strengthen monitoring and compliance mechanisms across the country to ensure a level playing field

Enforcement will ensure that all stakeholders (e.g., collectors, recyclers and producers) meet the requirements of the legislation, so no company can gain a financial benefit from not meeting these requirements. Enforcement will help create a level playing field for all companies.

Without enforcement, stakeholders that do meet the legislative requirements may be at a financial and operational disadvantage compared to companies that do not comply with the requirements; non-compliant companies can offer their products and services for a lower price by ignoring environmental, health and safety standards. This gives them a commercial advantage over companies that meet all requirements, and this should be avoided.

A clear list of criteria and sanctions can help send a strong signal to stakeholders that noncompliance will not be tolerated, and enforcement of legislation is a priority.

A lack of enforcement creates the risk that more and more stakeholders will choose not to comply with the legislation's requirements, and this can eventually lead to a total failure of the legislation. As such, enforcement is critical to the success of e-waste legislation.

Along with enforcing legislation, monitoring and compliance mechanisms should be developed and strengthened as a necessary additional step to levelling the playing field among collectors, recyclers and producers.

Different pieces of legislation may lead to uncertainty and confusion among stakeholders in the marketplace, and certain jurisdictions may lack the capacity to implement enforcement actions; thus, monitoring and compliance assistance can help stakeholders understand and comply with legislation. Stakeholders may consider developing public monitoring systems to improve transparency on collector, recycler and producer activity and help foster public accountability.

4. Create favorable investment conditions for qualified recyclers to bring the required technical expertise to the country

Design and implementation of favorable investment conditions within a country can trigger growth in domestic recycling technology. The new recycling technology will support treatment of WEEE as close to the source as possible, creating jobs and supporting national environmental goals.

Because investing in recycling technology that follows environmental standards may require research and development or other types of funding, it is essential to provide investors with favorable and stable market conditions, including fair competition among peers rather than unfair competition from informal players.

These conditions can be both economic and regulatory. They may be created by providing tax relief for investors who possess technical expertise or entering into public-private partnerships. Favorable investment conditions shall not benefit only the e-waste recycling sector, but also the recycling industry as a whole.

5. Create a licensing system or encourage certification to international standards for collection and recycling

The core aim of e-waste policy is to protect the environment and effectively recover natural resources. The application of a simple and effective licensing or certification system is key to ensure all collectors and recyclers are known to the authorities as well as appropriately authorized to carry out specific activities.

The licensing system should appropriately address the environmental and health risks associated with the activities undertaken. At the same time, it should reflect the respective country's capacity to handle such a system in terms of enforcement, institutional capacities, training, etc. A phased development of the licensing system should be developed.

At a minimum, all collection points must be licensed or in compliance with national regulations to receive, manage, sort and store e-waste, and all recyclers should be licensed or certified to receive, dismantle, sort, treat and store e-waste and output material for final recycling.

Collection points should work with their collectors and instruct them on how to handle e-waste. As the system evolves, collectors should receive training and be required to apply for a license to carry out their activities. Large-scale, professional collectors should be targeted as soon as possible. Requiring low-risk collectors to have a full and costly hazardous waste permit (as those issued to recyclers) would be deemed an inappropriate use of licensing.

Where national licensing systems are unavailable or insufficient to address environmental and health risks associated with activities undertaken, recyclers are also encouraged to be certified according to international electronics processing/ recycling standards.

6. If an informal collection system exists, use it to collect all e-waste, and ensure e-waste is sent to licensed recyclers through incentives

In many countries without legislation governing e-waste management, an informal and unregulated network of collectors and recyclers exists.

It is important for governments to develop guidelines or regulations that identify specific activities as informal and formal and define requirements for licensed recyclers.

To push existing flows of e-waste to regulated recyclers, it may be necessary to offer awareness and incentives to consumers (business, government and the general public) and collectors. The incentive could be offered by the producer, municipality or recycler, and this needs to be defined. The type of incentive (financial or otherwise), the e-waste streams subject to incentives and the incentive financing mechanism must be tailored and aligned to national legislation. The incentive would typically need to be more attractive than the payment by informal recyclers and encourage the collection of whole products over cherry-picked and partly dismantled items.

The informal collection and treatment network would shrink significantly over time, as the collectors enter into formal collection contracts with licensed recyclers.

In addition to offering an incentive to collectors, informal collectors must receive access to training and safety equipment in order to start operating under environmental, health and safety standards.

7. When no local end-processing facilities exist for an e-waste fraction, ensure good and easy access to international licensed treatment facilities

Countries often develop their own pre-processing facilities, for tasks like separating the basic material fractions (pre-treatment). To some extent, they also perform recycling (end-treatment) of materials, like plastics and steel, that can be efficiently recycled with relatively low technological investment. After recycling, these materials can be traded as raw material domestically or internationally.

Recovery of precious metals, such as those from printed circuit boards or cobalt from batteries as well as less valuable but potentially toxic materials, such as CRT glass and flame-retardant plastics, require high investment. Plants usually process a large amount of these materials to achieve economies of scale; these can only operate at a profit by processing high volumes of this material, which is impossible on the national level. This means that globally, only a handful of these recycling facilities are necessary to provide these specific recycling and resource recovery solutions. In order for these systems to run efficiently and economically, it is essential that countries allow specific material fractions to be exported and imported to these facilities and that this process is not

heavily burdened with time-consuming bureaucracy.

It must be ensured that legal requirements like the Basel Convention or the Bamako Convention do not lead to long delays or make it impossible to export waste fractions to these licensed international treatment facilities. A close monitoring of waste streams is necessary to ensure that they arrive in the specialised facilities for treatment.

8. Ensure that costs to run the system are transparent and stimulate competition in the collection and recycling system to drive cost effectiveness

Transparency on the actual recycling costs should be pursued to increase the consumers' and the general public's awareness of the financial requirements needed for proper e-waste management.
Fair competition between logistics providers and recyclers should be established to ensure the system's long-term cost effectiveness. One of the key elements that should not be decoupled from the cost effectiveness is the establishment and enforcement of minimum quality standards; the rationale for lowering processing costs should never be relaxing control over the disposal of hazardous fractions or the standards protecting the environment or worker health.

Transparency over the total technical costs along the chain can stimulate fair competition and simultaneously highlight areas where cost-effectiveness can be improved and where lower cost competition could pose serious risks.

In addition, irrespective of the financing model adopted (EPR-based or not), it is paramount that the funds secured for e-waste management are used to cover technical costs for e-waste management only and not diverted for other purposes to ensure the system's cost effectiveness.

9. Ensure that all stakeholders involved in e-waste collection and recycling are aware of the potential impacts on the environment and human health as well as possible solutions for environmentally sound treatment of e-waste

It is important to ensure that all stakeholders (generators, collectors, recyclers, government and financiers) are aware of the potential environmental and human health impacts of improper e-waste treatment. They must also understand the importance of addressing those problems and treating e-waste in a sound manner. If and when legislation is in place, these stakeholders need to be aware of this In terms of health and safety, so that they can understand the potential risks of improper handling techniques. This comprehension will help to ensure that generators and recyclers put in place safety standards and comply with regulations. Further awareness of serious environmental threats will encourage proper e-waste handling by generators and collectors, sound management and disposal of hazardous materials by recyclers, and it will stimulate the development cleaner technologies to manage these residues.

10. Create awareness on the environmental benefits of recycling among consumers

All waste collection programmes start with consumers (individual households or organizational entities), as consumers decide when and how to dispose of a product. It is therefore critical that consumers decide to utilize licensed recycling facilities instead of sending their waste to landfill, substandard treatment or incineration. The decision to send a product to a licensed recycler can be influenced by incentives and the awareness that recycling provides environmental benefits compared to other disposal options.

The consumer must also understand how to access the appropriate recycling streams. In some countries, awareness on the environmental benefits is high, but knowledge of how to participate or how verify such a recycling solution is low. It is therefore very important that consumers are well-informed on the environmental benefits of recycling to ensure they will support the system's creation and send products for licensed recycling when appropriate.

The set up and management of a recycling solution that prioritizes resource extraction may be more expensive than landfilling or other alternatives. Various financing models have been implemented around the world to combat that financial incentive, including a small price increase on products at the time of purchase, to a fee when the product is dropped off for recycing. When a consumer is unaware of the recycling system or the environmental benefits of recycling, he or she may be unwilling to pay the increase.

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(Jan 2016)

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About the Step Initiative:

"Step envisions tobe agents and stewards of change, uniquely leading global thinking, knowledge, awareness and innovation in the management and development of environmentally, economically and ethically-sound e-waste resource recovery, re-use and prevention."

Step is an international initiative comprised of manufacturers, recyclers, academics, governments and other organizations committed to solving the world's waste electrical and electronic-e-waste-problem. By providing a forum for discussion among stakeholders, Step is actively sharing information, seeking answers and implementing solutions.

Our prime objectives are:

- Research and Piloting
  - By conducting and sharing scientific research, Step is helping to shape effective policy-making
- Strategy and goad setting
  - A key strategic goal is to empower proactivity in the marketplace through expanded membership and to secure a robust funding base to support activity
- Training and Development
  - Step's global overview of e-waste issues makes it the obvious provider of training on e-waste issues
- Communication and branding
  - One of Step's priorities is to ensure that members, prospective members and legislators are all made aware of the nature and scale of the problem, its developmentop-portunities and how Step is contributing to solving the e-waste problem.

The Step initiative came about when several UN organizations, whowere increasingly aware of the growing global e-waste problem, saw the need for a neutral, international body to seek real, practical answers that would be supported by manufacturers, recyclers and legislators alike.

Step's core principles:

1. Step views the e-waste issue holistically, focusing on its social, environmental and economic impact – locally, regionally, globally.
2. Step follows the lifecycle of equipment and its component materials from sourcing natural resources, through distribution and usage, to disposal.
3. Step's research and pilot projects are "steps to e-waste solutions".
4. Step vigorously condemns the illegal activities that exacerbate e-waste issues, such as the illegal shipments, recycling practices and disposal methods that are hazardous to people and the environment.
5. Step encourages and supports best-practice reuse and recycling worldwide.

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