Towards Harmonized Recycling Certification in Asia
-Exploring the Feasibility and Potential Benefits of Harmonized Recycling Certification -

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Background Paper for
Special Event on Possible Introduction of Recycling Certification in Asia
at Greater Mekong Sub-region (GMS)
Sub-regional training workshop on
building capacity to deal with the illegal shipments of
e-waste and near-end-of-life electronics
10 July 2012, Hanoi, Viet Nam
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This report was developed as a background paper of Special Event on “Possible Introduction of Recycling Certification in Asia” at Greater Mekong Sub-region (GMS) Sub-regional training workshop on building capacity to deal with the illegal shipments of e-waste and near-end-of-life electronics from 10 July to 13 July 2012, Hanoi, Viet Nam. The report is based on a research project conducted by Institute for Global Environmental Strategies funded by scientific research fund “the Environment Research and Technology Development Fund ” of the Ministry of the Environment of Japan.

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1. Introduction

As resource demand grows in line with the rapid economic growth of developing countries in Asia in recent years, so too has the transboundary movement of recyclables in Asia. Although developed economies such as Japan, Republic of Korea or Taiwan have established collection and treatment mechanisms for recyclables, international trade based on gap in demands in recyclables has become a loophole of domestic recycling mechanism. At the same time, widespread urbanized life style in developing Asia has resulted in increasing consumption of electric and electronic products thus in increasing generation of e-waste. Considering environmental risks from unsound treatment of e-waste, establishment of appropriate treatment mechanism of e-waste is desirable in these countries. Recyclers tend to regard recyclables mainly as potential resources with economic value and not pay enough attention to potential hazards. This raises environmental and health risk of e-waste recycling based on cheap, improper recycling and treatment without proper environmental protection measures. Considering informal nature of recycling market of developing countries, uncertainty of the origins (i.e. from whom and where) of collected recyclables may be a barrier for recyclers or users of recyclables in using recyclables from developing countries from the perspective of Corporate Social Responsibility.

The Basel Convention has been stagnated by discussion over Basel Ban Amendment which includes prohibition of the export of hazardous waste from developed to developing countries. To breakthrough this stagnation, an omnibus decision on the Indonesian-Swiss Country Led Initiative (CLI) on improving the effectiveness of the Basel Convention was adopted at the 10th Conference of the Parties of the Basel Convention held in October 2011. Within this initiative, the requirements to allow the 1995 revision of the Basel Convention to come into force were clarified (includes contents which prohibit the export of hazardous waste from developed to developing countries, including for the purpose of recycling). On the other hand, a recent study by IGES, University of Tokyo, and Akita University showed that short term shortage in supply of metals\(^1\) for example will mainly be met by increasing supply of scrap materials thus recyclables\(^2\). At the same time, the countries without ratifying Basel Band Amendment will be able to export hazardous recyclable wastes but would face increasingly stronger pressure. Since most of recyclables has both potentially hazardous and valuable nature, international trade of recyclables will not be effectively and automatically

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\(^1\) In this study, examples of metals were iron and copper. However, implication on increasing needs for scrap would be applicable to other metals.

managed in more environmentally sound manner by implementing Basel Ban Amendment. In addition, many countries both developed and developing countries does not have a facility such as integrated smelter to manage both hazardousness and resource potential of e-waste. Considering that quality recycling facilities is necessary for treating these recyclables both in developed and developing countries, this will add strong international pressure to the development of mechanisms to manage recyclables in environmentally and socially sound manner. The resolution will also incorporate decisions on guidelines on environmentally-sound management (ESM), with Japan taking the initiative in studies in this area.

However, international policy discussions focusing on the Basel Convention tend to lean towards a regulatory and supervision of “illegal trade” but not giving incentives to best practices when dealing with the trade of waste and recyclables. On the other hand, when one looks at the reality of the expansion of the transboundary movement of recyclables driven by economic and market principles, such as economic growth and increased resource demand in developing countries in Asia (China, in particular), mechanisms to ensure proper trade in recyclables are crucial to promote sound recycling business.

In addition, movements to certify qualified recycling businesses for electrical/electronic equipment waste have emerged as a global trend, mainly in the United States and Europe. Responsible Recycle and e-Stewards are certification systems for recycling businesses in the U.S. In Europe, actions are in place to set standards for technology and management of recyclables (WEEELABEX) from electric and electronic equipment waste, including transport, sorting, storage, treatment and final disposal. These standards will be included in the requirements for CENELEC, which is the European standard. Also, Australia and New Zealand have created common standards for recycling facilities and both countries are strengthening the management of waste electric and electronic products.

In connection with this, the Institute for Global Environmental Strategies (IGES) is conducting research on the possible introduction of recycling certification systems in Asia over a two-year period from FY 2011 to FY 2012 as a research project funded by the Environment Research and Technology Development Fund of the Ministry of the Environment of Japan. This research will contribute to the examination of the potential introduction of balanced, international standards with regard to certification of environmentally-sound recycling businesses in Asia.
2. Aim of Workshop & Recycling Certification Targets
With the participation of experts from research institutes, governments, international organisations, businesses and certification bodies, this workshop will identify opportunities to nurture good behavior of recycling businesses and to promote the proper trade of recyclables in Asia. Through this, the workshop will aim to exchange ideas and share experiences on how best to make use of certification systems for nurturing “good” recycling businesses.

The recycling certification system discussed at this workshop is a voluntary system/standard that aims to easily identify businesses that properly manage and treat resources in recycling markets, with national governments, third party certification bodies or trading companies issuing certification for qualified recycling businesses, and making information public. Although certification (first-party certification) through an internal audit is not a part of this definition, it includes certification by affiliated industry groups (second-party certification) and third-party certification that uses standardised specifications. The recyclable resources targeted in this research include waste electric and electronic products. In this case, recyclables take two general forms i.e. post-consumer waste and industrial waste. The first is waste generated from consumed products (including scrap). The second includes electric and electronic items/components derived from the byproducts, industrial waste and business waste resulting from the production process of electric and electronic items (scrap parts that do not fit standards, etc.)

3. Introduction of Recycling Certification and Expected Outcomes
The following three benefits are expected from the introduction of recycling certification systems to identify environmentally-sound recycling businesses.

Promotion of environmental, occupational health and safety management
In order for the promotion of recycling to contribute to the sustainable development of Asia, it is important that recyclable resources do not end up in improper treatment processes. To ensure this, the central and local government must cooperate to lower incentives for cheap and potentially damaging treatment and recycling, such as is seen in the treatment of strong acids and open incineration, by effectively executing environmental and labour standards. For this purpose, it is necessary to clarify environmental, health and safety management guidelines at the facility level.

Fostering quality recycling businesses
The use of technology and facilities that allow for sound environmental management as well
as quality resource recovery (higher rate in recovery of important resources) is necessary for the proper treatment of recyclable resources. As well, a rapidly-developing Asia anticipates an increase in the generation of industrial waste, byproducts and business waste. In many cases, the treatment of such waste cannot be processed by emitters alone. Therefore, it is necessary to foster and nurture credible waste and recycling contractors to bridge this gap. Recycling certification systems provide an opportunity to identify and foster contractors that can conform to proper treatment guidelines as well as operate under efficient recovery technology.

**Encouragement of sound domestic transaction and international trade of recyclables**

It is necessary to build a market that contributes to resource efficiency and covers environmental protection so that recovered resources may circulate freely. For this purpose, it is necessary to encourage the development of a recycling market by securing the transparency of domestic transactions and international trading of recyclable resources. In other words, what required is a mechanism that is able to make direct and reliable connections/matching between emitters and quality recycling businesses in domestic markets.

Likewise, the number of countries with facilities that can transform waste into a recyclable resource is limited. Considering this situation, establishment of international recycling network of quality recyclers or regional recycling hub would be an option to ensure environmentally sound and economically efficient management of recyclables. If recycling certification is introduced at the regional level and the transboundary movement of recyclable resources to qualified recycling businesses can be promoted, it can contribute to improvement in resource efficiency and environmental protection through economy of scale in the region. Furthermore, the flow of recyclable resources to internationally certified recycling businesses in the Asian region may simplify procedures set out in the Basel Convention.

4. **Points to Consider in the Introduction of an International Recycling Certification System in Asia**

The following may be points to consider in the introduction of an international recycling certification system in Asia for the management of waste electric and electronic equipment with consideration of three expected benefits, which explained in previous section. To understand minimum standards and to identify potential area where voluntary certification scheme would be useful, IGES has conducted a research reviewing existing national permits and approval system of recycling facilities in nine countries/region in Asia as well as looking
into seven existing voluntary certification schemes of WEEE recyclers.

**Environmental, occupational health and safety management**

As minimum regulatory requirements, the main objective for permits and approval system of recycling facilities under both existing recycling related laws and hazardous waste management related laws is to ensure environmental, health and occupational safety management in the recycling process (see Table 1 in reference). Likewise, existing voluntary recycling certifications (see Table 2 in reference) for waste electric and electronic equipments (e.g. Responsible Recycling and e-Stewards) require environmental management system and additionally require occupational health and safety management system as well. Environmental, occupational health and safety management is a fundamental object for recycling certifications.

**Granting incentives for fostering environmentally sound recycling businesses**

Variations can be seen for each country in the establishment of incentive mechanisms that are instrumental to the capacity training and development of quality contractors, which is the second point to consider in the introduction of international recycling certification systems. It is necessary to examine the association with incentives to carry out sound recycling that takes into account the entire process from collection to treatment for waste electric and electronic equipment, and not a system that only sets out regulations. The use of subsidies from an electrical home appliance fund for certified recycling businesses, in the case of Taiwan, could be considered an effective means to collect electric and electronic equipment waste from households in response to the common issue of the informal recycling sector in each country. Special licensing systems have also been set up entrusting hauling and pick-up to the informal sector and for final treatment to be carried out by qualified treatment/recycling businesses (Malaysian case).

In addition to incentive to facilitate quality recycling businesses, depending on different targets in recycling chains, there are various forms of incentives such as an incentive for industries emitting recyclables, incentive for environmentally-sound management, or incentive for proper international trade.

Thus, it is worth examining the provision of incentives to emitters to select qualified treatment/recycling businesses and easing import-export procedures for hazardous waste that falls under the Basel Convention for transactions between certified recycling businesses.
Traceability and mass balance system to encourage domestic transactions/international trading of recyclable resources

The development of a Chain of Custody throughout recycling chain is important for encouraging domestic transactions/international trading of recyclable resources. The method for ensuring reliability in the downstream of current recycling chain is mainly enforced through detailed capacity assessment for downstream recyclers, audits of actual treatment, and written contracts. In addition to this, the following are important elements for an effective Chain of Custody System: sufficient information about quantity, important control point management, and sufficient training and management of employees. In particular, our country case-studies and our comparative analysis of existing voluntary recycling certification systems showed that a traceability system and mass balance system in the recycling chain serve as the keys to ensure sufficient quantity of information and control point management. A traceability system such as a manifest system is for tracing waste stream in each treatment process. And a mass balance system can record weights based input/output data on materials such as metals going in and out from a treatment facility.

That said, however, existing systems grant certification to individual recycling businesses, and at present, only certifies a “point” in the recycling chain. The next step in the certification process should be moving forward from the certification of “points” to the certification of “channels” that connect point A to point B along the recycling chain. For this purpose, it is necessary to develop a system that recognises the Chain of Custody, such as forest certification, using FSC as an example. In order to add value to end products, the Chain of Custody is executed in the supply chain, however, there is no such existing value-address for end-products from quality recycling chain. In other words, under current recycling mechanism, there are no clear differences in value of recycled products either which are from quality recycling process or not. A system that promotes the preferential use of recycled materials in electric and electronic equipment and adds relative value through the Chain of Custody is necessary to accomplish this objective.

Object/target of certification

How to classify different recycling functions could be a key for effective recycling certification. The function of recycling businesses can be divided into three general categories: collection, transport and sorting; storage and dismantling; and

3 “Chain of Custody” refers to experience of certification mechanism of forest stewardship council. This is a certification mechanism to certify whole supply-chain from production, manufacturing, trading and routes towards final consumers. Chain of Custody for waste electrical and electric equipments in recycling chain can be possible to maintain from collection, logistics, treatment toward recovered materials through verifiable system of traceability at each stage.
treatment/recycling of products, components, and materials. In order to avoid unnecessary requirement to waste collectors or transporters, it is necessary to examine possible development of certification for different category of recycling functions, such as is being carried out standards of collection, logistics and treatment by WEEELabex (see Table 2). With regard to collection, transport and sorting of resources, there are advantages of integrating informal sectors into the formal recycling chain, as concerns about environmental pollution, worker safety and health impacts are low.

Although the influence of scrap contractors that are able to store, make transactions/trade, and dismantling goods is high in informal recycling in developing countries, one of the challenges for integrating into formal recycling activities is that these type of scrap contractors are often not recognised as recycling businesses in the certification and licensing systems in developing countries in many cases.

**Role of emitters is crucial**

Emitters of e-waste can be manufactures which generates industrial by-products and waste, households which generates end of life products, and professional users including governmental bodies which can be a large and reliable source of end of life products.

Especially, as an implication from the existing recycling certification systems, product manufacturers as an emitter of industrial by-products, play a major role in the success of existing recycling certification systems.

**It is important to include product manufacturers in the structure of recycling certification as emitters**, in addition to the three above-mentioned categories within the recycling process. Even in the cases with take-back system for WEEE is established through the EPR-based recycling laws, certification of quality recyclers would contribute to streamline the system that commission treatment of waste products collected from households to credible recycling businesses (e.g. e-Stewards Enterprises).

For collection of emitted wastes from household and professional users, it is more about how to establish recycling mechanisms such as those based on EPR principle or to adjust market of secondhand-products. Thus, it is not only about certification.
Reponses to diversity in the Asian region

When transitioning certification mechanisms into international standards, differences in geographical, political and business development should be reflected. For example, many countries in the region have not introduced recycling laws on the basis of extended producer responsibility. When looking at the status of Asian countries with regard to improvements in laws and regulations, we can see that they are roughly divided into two groups: countries/region that have implemented recycling related laws specialising in the management of waste electric and electronic equipment (e.g. Japan, Republic of Korea, China, or Taiwan; See Table 1), and countries that manage the disposal of this type of waste based on the management of hazardous waste (e.g. Indonesia, Thailand⁴, Philippines, Viet Nam, and Malaysia; See Table 1). Both types differ greatly in their responses to managing such waste.

It is necessary to consider whether certification should be promoted as either bottom-up or top-down in Asian countries in order to promote recycling businesses to certification systems, EU’s case is considered as Top-down approach since the WEEE directive created EPR based recycling systems in this region. WEEELABEX is closely working with WEEE directive for the next revision. On the other hand, the case of United States of America case such as R2 and e-Stewards can be considered as bottom up approach since recycling regulations are depends on states and US-EPA encourage recycling sectors for waste electrical and electronic equipments to certificate their activities. Thus, under these certification schemes, business sectors need to take voluntary actions in countries without EPR based recycling law. Asian cases can be based on to bottom up since regulations are very much diverse among countries. However, top down approach can be taken among the countries where EPR based recycling law are implemented.

In addition, it is similarly important to consider whether to promote participation in certification systems using a top-runner approach to encourage best practices approach or an approach to cut off unsound business conducts (borderline approach). When utilising a borderline approach, a ranking system for the capacity of recycling business facilities should be considered an appropriate policy response as it is possible that the situations in countries that have not currently developed appropriate responses may remain as is. By introducing a ranking system, dismantling of waste products or treatment of non-hazardous materials (e.g. single material like plastic, metals etc.) can be managed by businesses that are ranked low, and specialised treatment/management such as metal

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⁴ Thailand has developed a draft of EPR based recycling law however it has not been approved yet.
recovery from printed circuit boards can be designated to specified businesses that are ranked high. With certification systems, equipment/parts that may have an adverse impact on the environment or workers due to improper recycling can be identified, and regulations for treatment can be laid down, making it highly compatible with a ranking system.

From these perspectives, it is necessary to examine international recycling certification systems for the greater Asian region that considers systems that reflect differences in treatment capacity, without adversely affecting the foster of quality recycling businesses.

Certification system requirements and quality recyclers
Existing certification systems have respectively set original requirements for certification. These can be categorized into the three expected outcomes (See Table 3 for details).

Requirements related to environmental, occupational safety and health management and organisational/management matters include the following: (1) compliance with legal requirements, (2) introduction of Environmental Management System, (3) identification of hazards/risks, (4) occupational safety and health standards, (5) Awareness and competency of staff, (6) monitoring/recording/reporting systems, (7) emergency responses and (8) securing revenue resources (insurance for accidents, etc.).

Traceability and proper domestic transactions/international trade is often managed through the following requirements: (9) ensuring environmentally sound management in downstream (10) domestic traceability, (11) international traceability.

Items related to capacity improvement and development of recycling industries are in general set as follows:(12) regulations for the removal of pollutants, (13) quality management of reused materials, (14) reuse, (15) treatment and handling, (16) storage, (17) separate collecting and classification, and (18) deleting data from waste electric and electronic equipment.

Our case study in Asian countries has shown that the followings are characteristics of quality recycling businesses.

- Ensuring traceability of trading partners to prevent open dumping after extraction of valuable materials.
- Analysis of the content of recyclable resources at the request of emitters.
- Introduction of mass-balance tool and understanding of rates for recycling and
reclamation at the request of emitters.

- Sound management of residues.
- Acceptance of recyclable resources in line with technology and treatment/management capacity, etc.

The above characteristics deserve an examination as candidates of required conditions for quality recycling businesses.

5. **Issues for Discussion at Workshop**
The workshop aims to discuss whether it is possible to introduce recycling certification to recyclers of waste electric and electronic equipments in Asia. The following are the examples of issues for discussion at the workshop.

**Basic points**
- What is the most effective definition of recyclers? Is it suitable to be categorized into different functions? Would a certification system have to cover all functions and stages of the recycling and waste management chain or would it be sufficient to certify only certain parts of the chain? Is it sufficient to certify individual treatment facilities or do certification systems need to cover whole recycling and waste management chains?
- What are the requirements and conditions for quality recyclers?

**Objectives**
- To what extent could recycling certification contribute to the following objectives?
  - Environmental, health, and occupational safety management
  - Development of quality recyclers
  - Ensuring appropriate domestic transaction/international trade

**Lessons from existing certification systems**
- Are the requirements in existing certification systems reasonable and effective?
- What are the weakest or most critical parts of existing systems?
- Who would be certifiers for effective and reliable certification mechanism? Can private organization operate and implement such certification mechanism?
- What motivates recycling companies to become certified and why do certain emitters prefer to contract with certified recyclers? How can these drivers be strengthened?
- How we can ensure chain of custody? Are ensuring “traceability” and “mass-balance accounting” enough for this purpose?
- In addition to certification mechanism itself, what kind of additional measures are
needed to ensure quality recycling?

**Asian Context**

- In your opinion, how feasible is the idea to establish regional recycling centers or international recycling hubs based on a harmonized certification system?
- What are the key factors that influence whether such an initiative would succeed or fail?
- How to reflect diversity of recycling market in Asia?
### Table 1. Comparison of Management of Waste Electric and Electronic Equipment & Recycling Certification Systems by Country

<table>
<thead>
<tr>
<th>Presence of waste electric/electronic related systems (household/PC)</th>
<th>South Korea</th>
<th>Taiwan</th>
<th>China</th>
<th>Indonesia</th>
<th>Thailand</th>
<th>Philippines</th>
<th>Vietnam</th>
<th>Malaysia</th>
<th>Japan</th>
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<tr>
<td>Infections (compliance with standards)</td>
<td>Work permit, proper treatment of waste, proper sanitation of facilities, proper treatment methods, wastewater management, land-use restrictions after use, etc.</td>
<td>Work permit, proper treatment of waste, proper treatment methods, wastewater management, land-use restrictions after use, etc.</td>
<td>Standards for sites, factors and required facilities, environmental protection technology, impact assessment</td>
<td>Permission for treatment of hazardous waste; technical guidelines have been defined for the storage, collection, treatment, and use of hazardous waste</td>
<td>Permission granted to recycling businesses based on standards for sites, factories and required facilities</td>
<td>Permission granted to recycling businesses based on standards for sites, factories and required facilities</td>
<td>Permission for businesses carrying out recycling, collection and treatment (Regulated MSEH / VEA if activities cross state lines). Usually, there are a number of internal systems that are operating under different regulations.</td>
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<tr>
<td>Inspections (compliance with standards)</td>
<td>On-site inspections by staff from environmental departments and Korea Environment Corporation</td>
<td>Number of inspections by government-contracted auditors that are capable of checking for proper conduct of business</td>
<td>Paper-based inspections of hazardous waste operators after 2-3 month examination period.</td>
<td>Formal approval of hazardous waste operators after 2-3 month examination period.</td>
<td>Minimum of once a year</td>
<td>On-site inspections by EMS local offices.</td>
<td>Regular on-site inspections by VEA and irregular inspections by environmental police. However, in practice, control of informal sector is limited.</td>
<td>On-site inspections by DOE staff (after construction of factories)</td>
<td>Storage of implementation reports, track records, and home appliance recycling tickets</td>
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<tr>
<td>EMS (company standards, project implementation system) (industry/company)</td>
<td>Research on standard preparation for the proper reuse of facilities for waste electric/electronic equipment compiled by KEEC</td>
<td>Government provides guidelines such as standards on submitting treatment plans, labour safety management and fire prevention.</td>
<td>No particular regulations</td>
<td>Indonesia government requires that companies submit EIA</td>
<td>No standards set, in particular. Company standards are independent.</td>
<td>None, in particular. Company is responsible for EIA.</td>
<td>EIA is required when applying for licensing; however, this is not applicable to the informal sector.</td>
<td>Metal recovery certificates are required to submit EIA</td>
<td>EIA management reports, on-site inspections of producers. No particular check items by individual manufacturers or economic body</td>
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<td>Recommendation system to improve achievement rates</td>
<td>Achievement of amount required for reuse, and amount required for recovery (charges for not meeting requirements)</td>
<td>Conditions for providing subsidies and establishment of monitoring equipment in addition to proper treatment capacity)</td>
<td>Specifications of treatment permits in terms of volume/amount of hazardous waste, and conditions that are required to ensure that the manner of waste management is appropriate for residential/household waste.</td>
<td>No ranking system in place for recycling businesses; however, a ranking system is proposed for management activities for all producers (PEFTZ).</td>
<td>Start of ranking system for waste treatment, recycling businesses (2010~). Awards for excellent businesses.</td>
<td>Environmentally excellent companies (awards given for adherence to environmental principles, recognition of environmental protection technology, etc., and those that recover metals.</td>
<td>None, in particular.</td>
<td>Rubicon Award for companies in all business categories. No award system in place; limited to recycling industries.</td>
<td>7EC management reports, on-site inspections of producers. No particular check items by individual manufacturers or economic body</td>
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<td>Manifest / Traceability</td>
<td>Use of online manifest system (EcoAS) for movement within country.</td>
<td>Control documentation that indicates movement of items from consumers to retailers, and retailers to recycling plants is currently being developed.</td>
<td>Although a system has been developed to record the names of waste electric/electronic equipment and how it is managed, and contractors that are involved with the management of these facilities, no system is in place to manage information, but not risked in any specific applies.</td>
<td>Manifest is required for movement of hazardous waste. E-manifest has also been introduced.</td>
<td>Implemented with a 6 page manifest. E-manifest has also been introduced.</td>
<td>Possible to create flow of hazardous waste from businesses to transporters, and transporters to contractors using manifest. Generators of electric/electronic equipment are responsible for treatment and no string of facilities are treated as treatment facilities.</td>
<td>Manifest system for hazardous waste is in place. In addition, there are many cases in which the manifest system is not used for treatment and no string of facilities are treated as treatment facilities.</td>
<td>Manifest system for hazardous waste is in place. In addition, there are many cases in which the manifest system is not used for treatment and no string of facilities are treated as treatment facilities.</td>
<td>Household equipment recycling tickets (from consumers to retailers, under producer responsibility for recovery)</td>
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<td>Recommendation system to improve achievement rates</td>
<td>Achievement of amount required for reuse, and amount required for recovery (charges for not meeting requirements)</td>
<td>Conditions for providing subsidies and establishment of monitoring equipment in addition to proper treatment capacity)</td>
<td>Specifications of treatment permits in terms of volume/amount of hazardous waste, and conditions that are required to ensure that the manner of waste management is appropriate for residential/household waste.</td>
<td>No ranking system in place for recycling businesses; however, a ranking system is proposed for management activities for all producers (PEFTZ).</td>
<td>Start of ranking system for waste treatment, recycling businesses (2010~). Awards for excellent businesses.</td>
<td>Environmentally excellent companies (awards given for adherence to environmental principles, recognition of environmental protection technology, etc., and those that recover metals.</td>
<td>None, in particular.</td>
<td>Rubicon Award for companies in all business categories. No award system in place; limited to recycling industries.</td>
<td>7EC management reports, on-site inspections of producers. No particular check items by individual manufacturers or economic body</td>
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<th>(3) Encouraging transactions / trading</th>
<th>System</th>
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<tr>
<td>Manifest / Traceability</td>
<td>Use of online manifest system (EcoAS) for movement within country.</td>
<td>Control documentation that indicates movement of items from consumers to retailers, and retailers to recycling plants is currently being developed.</td>
<td>Although a system has been developed to record the names of waste electric/electronic equipment and how it is managed, and contractors that are involved with the management of these facilities, no system is in place to manage information, but not risked in any specific applies.</td>
<td>Manifest is required for movement of hazardous waste. E-manifest has also been introduced.</td>
<td>Implemented with a 6 page manifest. E-manifest has also been introduced.</td>
<td>Possible to create flow of hazardous waste from businesses to transporters, and transporters to contractors using manifest. Generators of electric/electronic equipment are responsible for treatment and no string of facilities are treated as treatment facilities.</td>
<td>Manifest system for hazardous waste is in place. In addition, there are many cases in which the manifest system is not used for treatment and no string of facilities are treated as treatment facilities.</td>
<td>Manifest system for hazardous waste is in place. In addition, there are many cases in which the manifest system is not used for treatment and no string of facilities are treated as treatment facilities.</td>
<td>Household equipment recycling tickets (from consumers to retailers, under producer responsibility for recovery)</td>
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<td>Requirement for Recycling (R2)</td>
<td>e-Standards</td>
<td>REACH (Recycling Industry Operating Standard)</td>
<td>WEEEplus (Legislative Treatment)</td>
<td>Recycler Qualification Systems for Recycling Business</td>
<td>EUROPCAP Program for End of Life Treatment of Electronic Recycling</td>
<td>Australian/New Zealand Standard, Collection, Storage, Transport, and Treatment of Used Electrical and Electronic Equipment</td>
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<td>Characteristics</td>
<td>- Export possible with conditions - Acquisition recommended through USEPA website - Export limited, in principle possible only in OECD standard - Export limited, in principle possible only in USEPA standard - Solid elements of EHSMS - Management of input and output for transport, treatment, and storage of products/parts (Standards for recovery/collection, treatment and disposal, and storage of products/parts) - Management of input and output for transport, treatment, and storage of products/parts - Linkage between mass balance and traceability - Staffing capacity for recovery and recycling of products/parts - Staffing for recovery and recycling of products/parts</td>
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**Reference**

Table 2. Certification Systems of Recycling Businesses for Waste Electronic/Electronic Equipment
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<th>Parts</th>
<th>Compliance with Legal Requirements</th>
<th>Identification of Hazards and Risks</th>
<th>Occupational Safety and Health</th>
<th>Accuracy and Competency of Staff</th>
<th>Emergency Response</th>
<th>Secure Financial Resources</th>
<th>Secure Data Management</th>
<th>Environmental Traceability</th>
<th>Distribution Chain-ability</th>
<th>Quality Management of Recyclable Materials</th>
<th>Other</th>
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**Table 3. Comparisons of Standards for Certification Systems of Recycling Businesses for Waste Electric/Electronic Equipment**

- **Compliance with Legal Requirements:**
  - **Identification of Hazards and Risks:**
  - **Occupational Safety and Health:**
  - **Accuracy and Competency of Staff:**
  - **Emergency Response:**
  - **Secure Financial Resources:**
  - **Secure Data Management:**
  - **Environmental Traceability:**
  - **Distribution Chainability:**
  - **Quality Management of Recyclable Materials:**
  - **Other:**

**Columns:**
- **Compliance with Legal Requirements**
- **Identification of Hazards and Risks**
- **Occupational Safety and Health**
- **Accuracy and Competency of Staff**
- **Emergency Response**
- **Secure Financial Resources**
- **Secure Data Management**
- **Environmental Traceability**
- **Distribution Chainability**
- **Quality Management of Recyclable Materials**
- **Other**

**Rows:**
- **Provision**
- **Section**
- **Part**
- **Section 5.1**
- **Part A.1**
- **Part A.2.1**
- **Part A.2.2**
- **Part A.3**
- **Part A.4.5**
- **Part A.5.1**
- **Part A.6.3**

**Notes:**
- 4.1.2: Number of recalls of products that have been determined.
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