Chapter 4

Informal Collectors of Recyclable Waste and Used Goods in Indonesia

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CHAPTER 4

Informal Collectors of Recyclable Waste and Used Goods in Indonesia

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1. Introduction

This report is the continuation of previous report entitled *Current Situation of Waste Recycling in Indonesia* [1]. The latter discussed the aspects of relevant regulations on hazardous wastes (HW) and municipal solid waste (MSW) in Indonesia. It addressed numerous constraints that have made HW and MSW in Indonesia under-performed. Waste and used goods collection activities, especially among informal sectors, serve as the most dominant recycling activities in Indonesia. For industrial wastes, especially hazardous one, most activities associated with recycling are performed by the formal sectors.

Every country recognizes the importance of recycling. In most countries, plastics, glasses, papers, and metals are well collected by either informal sectors or municipalities for recycling. In the case of the MSW in Indonesia, there are two main recycling flows. In the first flow, collectors, including those in the informal sectors, collect recyclable materials at sources. In the second flow, these materials are separated and recycled by the municipality after MSW collection.

This report will discuss used goods and wastes recycling activities, especially among informal sectors, in more detailed. This report emphasizes its discussions on the roles and the linkage of one informal sectors' stakeholder with another's in performing their activities as waste and used goods collectors, and how the materials flows and qualities are applied on the economic transactions by informal sectors in Indonesia.

2. Understanding Wastes and Recycling

Waste recycling in Indonesia is not a new activity. The Indonesian community has long been practicing used goods trading such as used clothes and the like, especially among waste traders (junkmen). So has industrial waste, they are not new at all.

As discussed in the previous report [1], according to Indonesia's regulation, there are three types of wastes associated with recycling:

- MSW and their equivalents: regulated under the Law 18/2008 on Solid Waste Management. It specifies that recycling is the key for a successful waste management. However, the detailed regulations on this waste recycling are not available yet until this time. Operationally, the stakeholders related to waste management, such as State Ministry of Environment Indonesia (MEI), Ministry of Public Works (MPW), most of local governments, NGOs etc. agreed to take these waste recycling efforts to be realized in Indonesia.
- HW: the Law 32/2009 on Living Environment Protection and Management superseding Law 23/1997 on Living Environment Management (superseding Law No. 4/1882), places the issues of hazardous materials and wastes as one of its main concerns. The more detailed regulation on hazardous waste management is the Government Regulation 18/1999 as amended by Government Regulation 85/1999. This regulation gives directions that recycling shall be one of the main efforts in managing HW. This regulation does not regulate radioactive wastes, because the latter is specifically regulated by the National Atom Power Agency.
- Any waste that does not belong to the above-mentioned schemes, such as non-hazardous industrial wastes, agricultural wastes etc. The handling of these wastes must comply to the Law 32/2009 and they are further regulated according to the effluent or emission standards issued by the MEI.

Waste definitions vary in different countries as well as the MSW definitions. Among developed countries, for instance, the definition of a MSW will encompass any goods that would be defined among developing countries as used goods that still have economic values. In developed countries, the elimination of used electronic appliances, furniture and fixture, used newspapers, used magazines, and used clothes, etc. incurs cost of disposal. Thus in developed countries, these goods are defined as waste and require further handling. On the contrary, in developing countries, these are regarded as valuable goods and could still be used after being repaired or by recovering their components in such a way that they could be reusable.

In developing countries such as Indonesia, one of the environmental problems faced in urban areas, particularly those in big cities, is improper waste management. Waste recycling efforts are strongly recommended in Indonesia. Therefore, the

common practice is linking the waste recycling activities with waste handlers. There are three groups of waste materials in the country that serve as the main objects by the recycling economic actors:

- Wet waste, especially organic waste, to be converted into composts;
- Dry wastes, especially those with the potentials to be recycled, such as papers, plastics, aluminum, etc.; and
- Used goods that serve as the objects of trading among used goods traders.

3. Understanding the Informal Sectors

Many people interpret the informal sector engaging in used goods and wastes economic transactions or trading in Indonesia as scavengers. But actually, the latter is just only one of those multiple stakeholders in recyclable collections. Indeed, it is the group that has attracted most attention due to its association with social issues faced by most urban areas in developing countries such Indonesia.

Informal sectors' activities are not considered illegal in Indonesia. Many economic activities, especially of small businesses, are performed by this group. All parties in Indonesia, including the Government, appreciate its resiliency in facing global economic crisis occurred in the country and other regions during 1997-1998. It is documented that this sector has the ability to absorb many independent labors, because the formal sector has failed to provide good and adequate job opportunities. Many city inhabitants in Indonesia who have formal jobs also engage in informal sectors' businesses after their formal work hours to increase their income.

Informal sectors activities are done openly and have not been deemed as illegal activities so that they are not involved with any security or law enforcement officers. These types of activities can be found in the entire city's corners, either at their own homes (legal) or on the public streets or unoccupied lands (illegal). However in most cases, "raids" launched by municipality's officers also happened on accounts that these activities are disturbing city's order, such as using sidewalks for their businesses, or occupying the areas that have been forbidden for such activities, such as city parks and others. Many of these informal sectors go door-to-door, by

offering goods or services directly to their prospective consumers. Usually, these activities can be found especially in the cities, such as house rental business, convenience and foods stores, electronic/electric appliance reparation/services, tailors, and other service sectors. It seems that the most dominant distinction between informal and formal sectors is that the objects of the latter are not taxation objects from their economic activities, including their billboards. In some cases, these informal sectors activities have some linkages with the formal sectors economic chains, and both of them are mutually dependent.

In recycling activities, the informal sectors engage primarily in using wastes generated by a household, especially dry wastes such as plastics, papers, metals, and the likes. Other categories of goods having potentials to be used are used goods. Wastes generated by an industry that belong to hazardous category are handled by the formal sectors.

The trading of dry wastes which are non-compostable has been the profession by choice or a profitable business among those people generally belonging to informal sectors [2]. Cycles of potentially recyclable and having economic values wastes start from their sources such as residential areas, industries and so on. These informal sectors activities are most attractive for businessman, involving main actors such as scavengers and waste traders, who collect wastes or used goods from door to door or their customers-partners. In addition to their contribution in reducing waste handling costs, other benefit is that they serve as one of generators of job opportunities.

4. Pathway of Recycled Used Goods and Wastes

Used goods trading in urban areas in Indonesia has long been practiced, such as at Cihapit (Bandung), as junk market that dated back since 1945 until this present time [3]. The types of junks that could be traded among junkmen, junk stores and junk market are as follows (Figure 1):

- Home appliances such as iron, blender, cake mixer, hair dryer, electric van, TV radio and tape recorder;

- Used fabrics and clothes;
- Shoes and bags;
- Used books;
- Used cassettes; and
- Woods from building demolition and furniture.

These used goods are usually placed at special locations, in forms of stores, street trading sites, and junk markets. In Bandung city for example, they can be found among others at Jatayu, Cihapit street electronic-junk market, junk-clothes market at Gedebage, used books and electronic junk markets at Cikapundung and lumbers trading businesses at Terusan Pasir Koja street. One of these used goods stores lies at Karapitan Street, Bandung. This store accepts varieties of useable objects under revenue-sharing scheme. Contrary to junk markets, these stores are actually belong to formal business, due to the fact that they display their stores as ordinary business stores, so that it could be ascertain that they should have been applied taxation obligations, including billboard taxes.

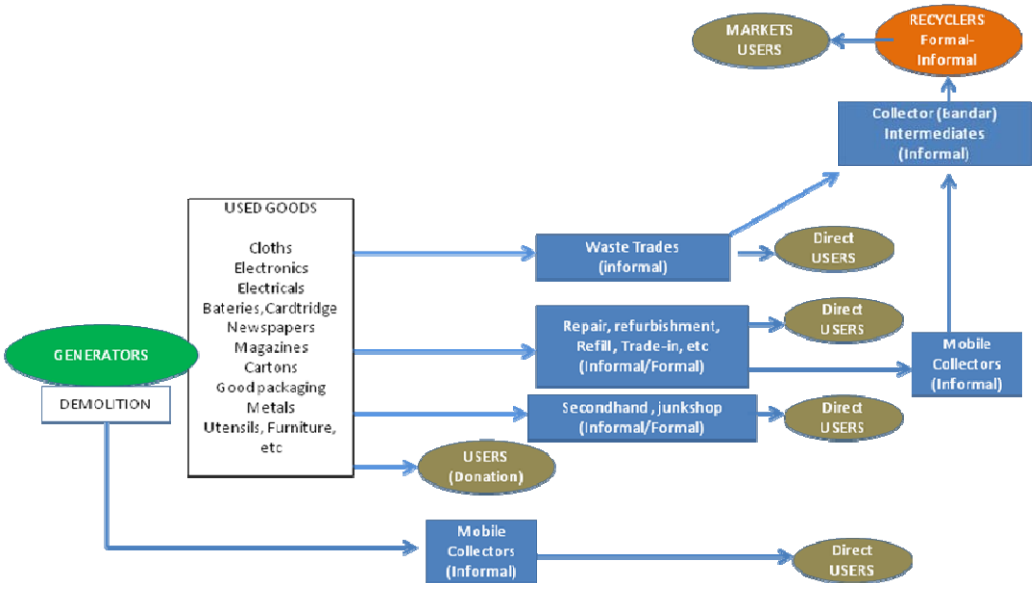

Figure 1. General pathway of recyclable used goods

In addition to used goods, such as electronic/electric appliance, lead battery and other objects that are considered as non-waste among Indonesians, the waste-category goods, or any goods that have been disposed by its owner and commonly found at public waste bins but still have potentials for trading are generally as follows (Figure 2):

- Hard plastic packaging (containers and cups/glasses);
- Transparent plastic sheets;
- Papers (blanks, magazines, books, newspapers, writing books);
- Cartoons;
- Metals (nails, irons, coppers); and
- Glass containers.

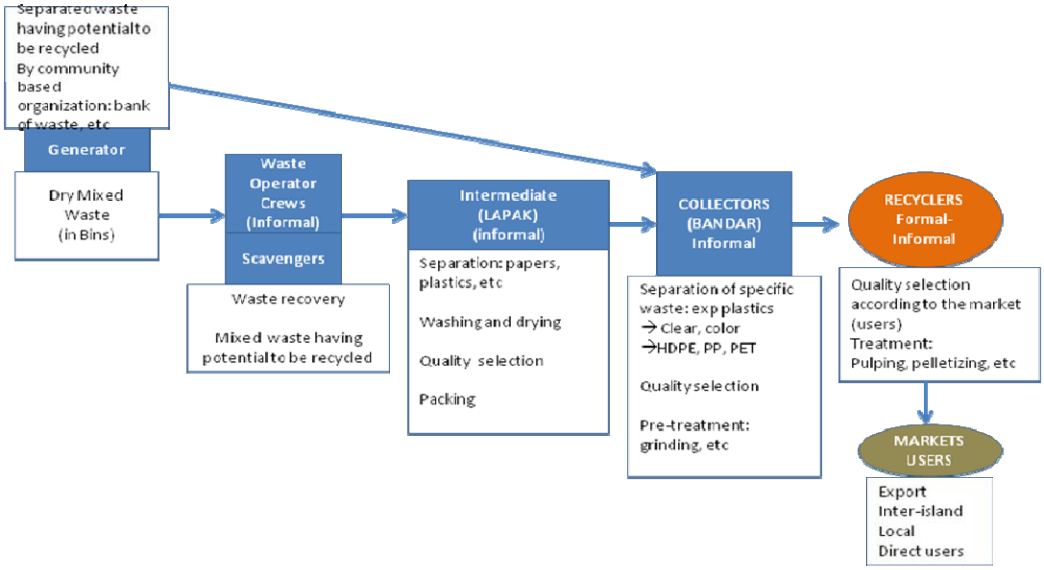

Figure 2. General pathway of recyclable wastes

These materials serve as economically valuable business objects among recycling actors from residential level, junkmen, scavengers, intermediates (*lapak*), dealers (*bandar*) to industrial level (recyclers). In general, the traded goods or wastes provided by 'sellers' such as junkmen would be suited with the most adjacent business scopes of the intermediates (*lapak*) who will buy those goods, and *lapak* should suit their business with their dealers (*bandar*). Generally, intermediates and

dealers will not engage in one single category of goods, such as a *lapak* at Cimahi, neighborhood that collect hard plastic packaging, glass containers, zincs, metals, cardboards and papers that subsequently be sold to two major dealers in Bandung and Cianjur. Another example is one of major dealers at Cipamokolan (Bandung), that engages itself not only in trading plastic packaging, but also converts these goods into pellets, in addition to accepting supplies of used metals such as used trellis fences and copper wires, used drinking cans and used spoons.

The pathways of potentially recyclable wastes and used goods vary with their respective market circumstances and the availability of recycler as their end processor. Figures 3 and 4 depict briefly the pathways of potentially recyclable wastes, used goods trading, and wastes from their source levels through end actors, which is developed based on field information from related stakeholeders in Bandung and Cimahi cities.

Used goods and wastes trading start at settlement environments. Middle-income residential area or higher usually donate their used goods free of charge to door-to-door junkmen or to wastes transport crews in their areas, or to scavengers who pass by in their front yards. Among mid to low income residential area, used goods or wastes that still have economic values serve as their additional source of income by selling them to door-to-door junkmen or directly to junkmen or trading sites or small craftsmen in their vicinities. The difference between junkman and scavenger is that the latter get their valuable wastes free of charge, while the former have capital to buy these used goods.

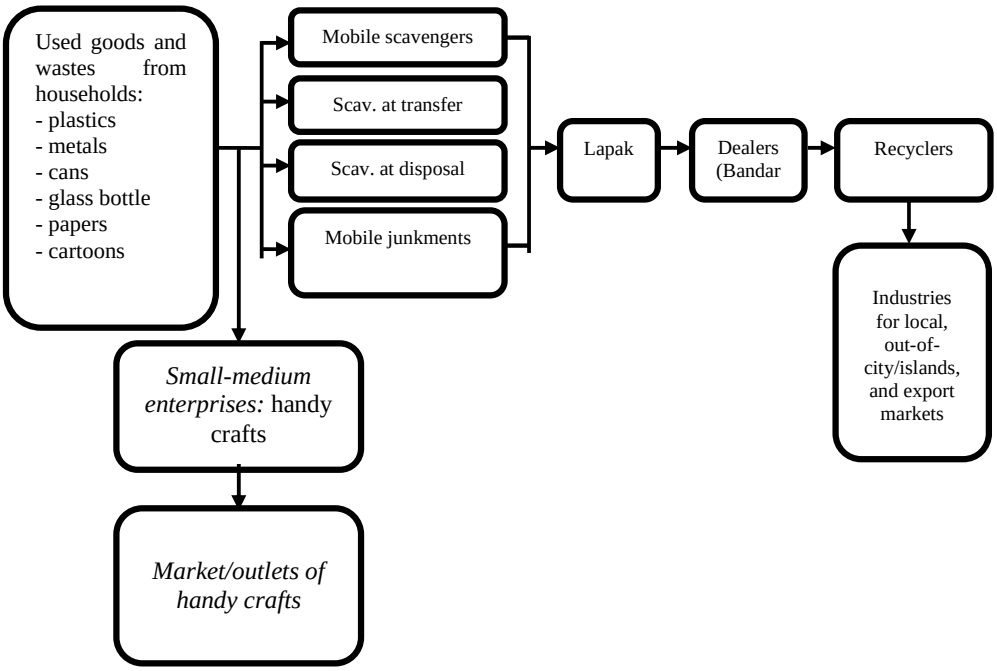

Figure 3. General path flow of recyclable used goods and wastes trading

The ranges of buying prices from junkmen or trading sites are affected by the condition of goods offered by the sellers. Prices flux occurred at wholesales level, and junkmen locations and trading sites. In general, however, these junkmen or trading sites are situated in the vicinities of the respective residential area. So, interdependent beneficial relationship occurred. Goods collected at junkmen and trading sites require initial processing to boost selling prices at the dealer level. For example, plastic packaging, glass containers and cans should be freed of its labels and covers, so that their prices will increase. Cleaned materials increase the selling value up to 40% to 50% from their base or dirty prices [4, 5]. Figure 4 demonstrates the pathway of second hand goods that attract most attention among urban areas.

Dealers as collectors of goods in mass-scales are usually have business scopes encompassing the processing of these goods, especially plastics, to be converted into goods available for recycling. Then the dealer will deliver these processed goods to the related industry/recycler within or outside their cities, or even according to them, they export collected recyclables to foreign countries such as China. At dealer level, goods categories such as iron, metal or glasses were not specially treated. As a common practice, a dealer has direct brokerage networks or

sells them to any industry that will utilize them. Glass bottle with certain trademark will be reclaimed by their respective factory that initially produced these goods. These brokers will collect used iron and metals by their qualities and sell them to some automotive assembling companies in Jakarta areas, for instance. Recycling factories as end actors are not only producing products, but also processed goods such as chopped papers, chopped or granulated plastics and iron scraps. Bekasi City and its vicinities are widely known for trading exported products, goods in process or materialss, though most of recycling materials within these areas are absorbed by domestic markets.

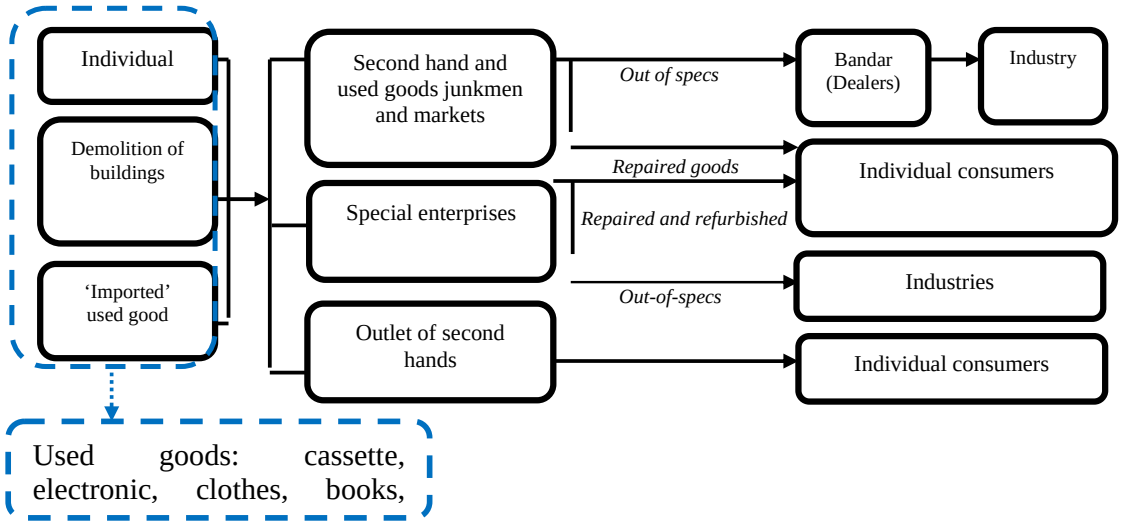

Figure 4. General path flow of used goods trading

Figure 4 above demonstrates the trading paths of used goods originated from several sources such as individuals who come directly to the junkmen, junk markets or used goods stores. This is the case for several types of goods such as used electronic appliances like second hand blenders, irons, mixers, tape recorders for automobiles, cassettes, shoes, bags, and books or magazines. The owners come directly to the junkmen or second hand markets and the buyer usually offers the prices according to the goods' respective conditions. The prices for repairable, out-of-order goods are normally 20%-30% below the market prices of the brand-new ones. The irreparable out-of-order goods are bought by junkmen in a much cheaper prices and even up to 5% - 10% of their market prices, and even, there are some

sellers who give them free of charge to the junkmen. In the case of irreparable used electronic goods, the junkmen usually will disassemble them and take their valuable components that can be sold to dealers, such as copper wires, screws, and plastic hard covers, or other components [7]. These dealers will subsequently sell them to related industries.

Another source of used goods, such as used clothes, is found mostly in major cities. In Bandung, there are junk markets for used clothes at Gedebage Market of Eastern Bandung, that buy these goods from brokers of imported used clothes originated from Taiwan, Korea and China at low prices per sack or ball of 1 hundred kg weight for trousers, T-shirts, shirts and jackets. The contents are reopened to mix them with used sweaters and T-shirts, and then sold to junkmen in other regions or individual junkmen with higher prices.

Other types of goods such as automotive electronics and other used electronics are sold individually by their respective owners to junk markets such as Cihapit market. These junkmen will resell them to the visiting consumer in minimally repaired conditions.

5. Wastes and Used Goods/Wastes Collectors

Overall, the stakeholders interested in recycled wastes are divided into the following main groups (Figure 5). Stakeholders for the recycled used goods and waste in all sectors of Indonesia are presented in Figure 6. The main actors who play the important role in collecting recycled wastes and used goods are:

- Scavengers
- Waste collector crews
- Junkmen (waste traders)
- Intermediates (Lapak)
- Brokers
- Dealers (Bandar)

5.1. Waste pickers (scavengers)

Used goods and waste recycling actors usually start from searching and collecting used goods. The lowest group consist of valuable used goods hunters at the disposed wastes, and they are called as scavengers (waste pickers). Usually, they are coordinated by the *lapak* owners or gatherers who accept and buy their used goods. They are searching and collecting used goods rigorously, including those on the rivers. Usually, there are social ties between scavengers and *lapak*, such as similar hometowns. In general, these scavengers are immigrant to the cities and not the latter's inhabitants. Their existence are assumed to be one of the social urban problems, because they are usually have no permanent domiciles, and are just living at the unoccupied spaces in the cities. Actually, they do not want to be scavengers as their permanent jobs. However, they immigrate to the cities due to economic necessities. Since they are generally unskilled and have no capital, they are forced to be scavengers.

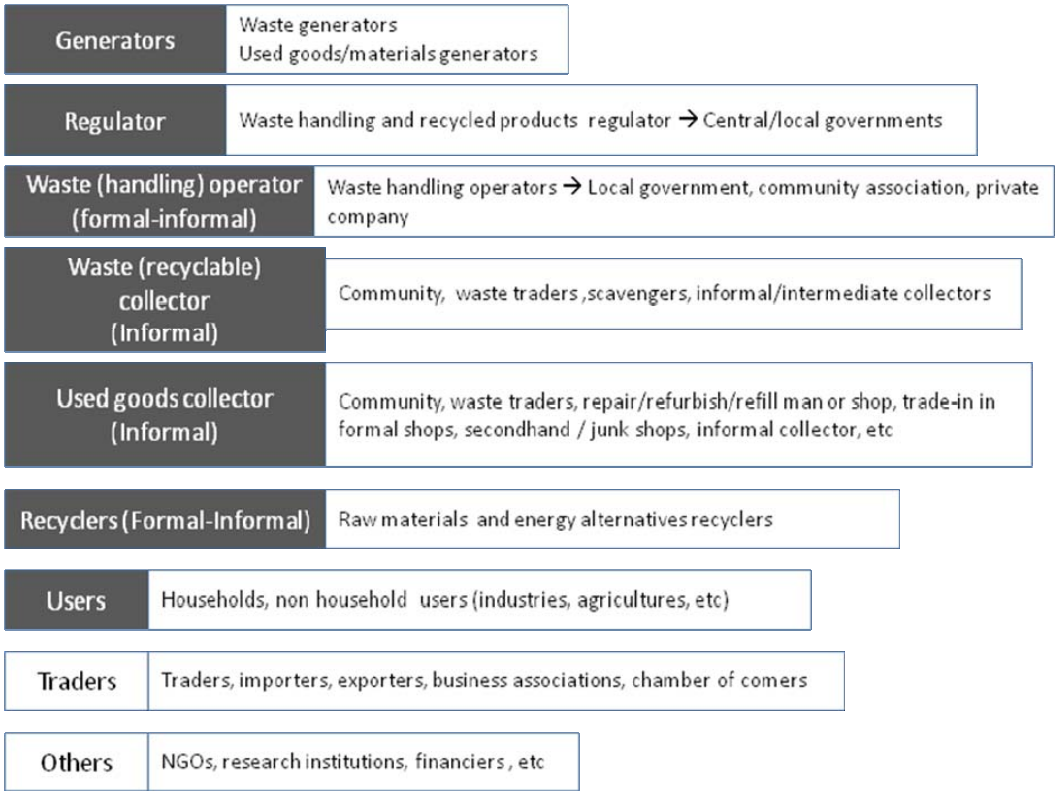

Figure 5. Stakeholder in waste/used goods recycling in Indonesia

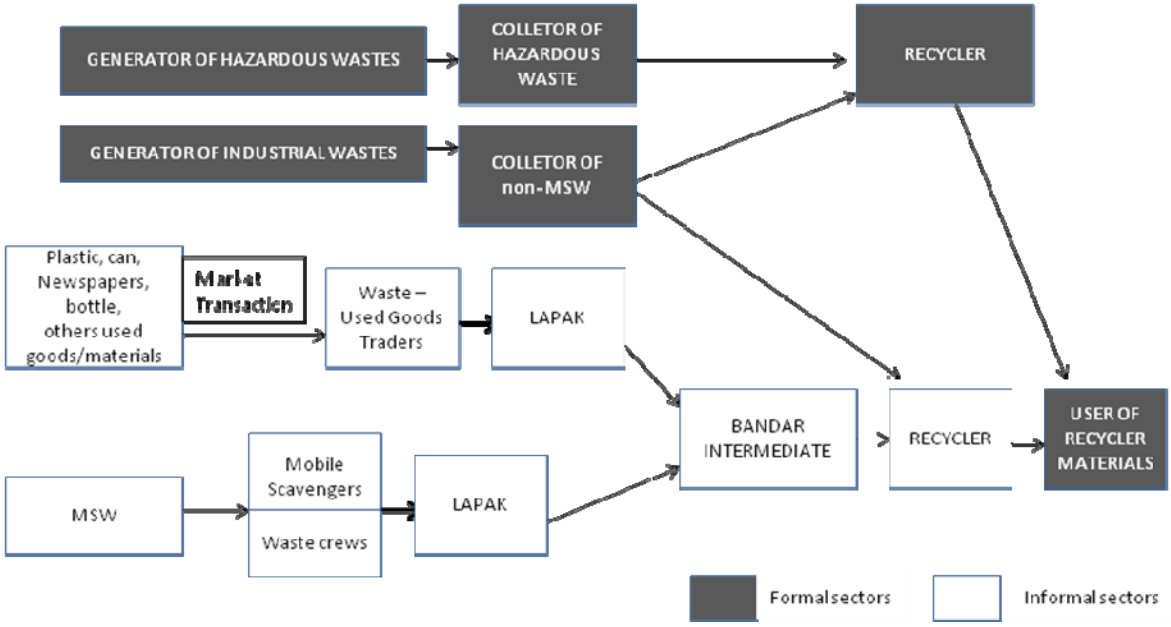

Figure 6. Formal and informal sectors in used goods/waste recycling in Indonesia

The existence of scavengers (waste pickers) in the waste management system brings about two different opinions. Some people consider that this activity do not only provide opportunities for the poor people who are working in this sector, but it also helps to reduce the amount of waste for disposal to the final dumping site. However, others consider that this activity bring a "bad" image to the country. So far, the role of informal sector in waste recovering activity has not been well organized.

Lapak lends money to the scavengers through credit sales for certain used items, similar to future trading, including provision of "shelters". Most of them involved in heavy debt conditions. Therefore, people who give them loans could serve as significant 'bond' and very influential, and their relationships in financial affairs could turn into the relationships between protectors and protectorates.

The scavengers usually start searching used goods in waste disposal bins from about 03:00–04:00 in the morning and ends at 4:00 in the afternoon over certain areas that have been controlled, usually at the crowded settlements, transfer waste sites, residential areas, market, commercial areas, and highways' sides. Based on

their locations, they are divided into door-to-door, transfer waste sites, and final waste disposal areas scavengers [6].

Door-to-door scavengers are the most easily found than other types of scavengers. The varieties of goods types that are obtained in door-to-door manner, at houses, stores or markets are greater than the varieties of goods types they obtained by searching from the transfer waste sites. The latter scavengers should compete small collectors (waste traders) who stand by at the transfer waste sites to get their used goods or wastes, because these collectors are usually more able to control any waste who come in already separated conditions thanks to waste transport crews, and have already business relationships with *lapak* or dealers.

Based on interviews with some of the scavengers in Bandung City and Cimahi City [5], they sell their goods to the nearest *lapak* or junkmen in dirty condition without any further treatment. Most of them are cup and bottle packaging plastics, newspapers, blanks, cardboards, cans and glasses. Scavengers' selling prices are determined by the *lapak* based on the estimated selling prices to the dealers. The scavenger's income is ranging from Rp. 15,000–Rp.25,000 (1 US$ = Rp. 9,200) a day, depending on the volume and the types of goods received. In general, they prefer collecting plastic packaging wastes and cardboards than the other items due to their higher prices. Door-to-door scavengers also obtain their items from some houses that have separated their wastes into plastic, papers, cans and other non-perishable items. On the end of the day, they will deliver their collected items directly to their *lapaks* customers under direct payment scheme. Based on dealers' requests, *lapaks* frequently ask one type of item to the scavengers in certain quantities by providing them capital. Generally, the scavengers will try to clear their own ways to became *lapaks* or small collectors after 8 years engagement as scavengers, such as by borrowing capital from *lapaks* to open warehouses and to buy old cart as collecting vehicle operated by 4-5 local scavengers.

5.2. Waste collector crews

Recycling actors who also actively act as recyclable waste collector are waste collector crews. In general, city waste handling among urban areas in Indonesia adopts two groups of waste managers:

- Community self-help; and
- City's waste manager.

The lowest level community unit in Indonesia is single-neighborhood (Rukun Tetangga), i.e., a group consisting of 30–40 households and led by sub-neighborhood leader regularly elected from among their own community members, and voluntarily in nature. About 10–15 neighborhoods will form one multiple-neighborhood. Like sub-neighborhood, the leader of the neighborhood is elected regularly from among their own larger community and voluntarily in nature, officially unpaid from their local government. Several neighborhoods form village leader or lurah. Village leaders are civil servants under their local government and are appointed based on formal and official assignment or decree of their respective district leader (Bupati) or city major. Coordinated by multiple-neighborhood leader through neighborhood leaders, communication between their respective communities with their local government will run in reciprocal ways.

One of single-neighborhood or multiple-neighborhood tasks is associated with daily waste (garbage) collection of their inhabitants that should be handled. Subject to the agreed upon agreements, waste collecting from one household to another can be in form of either single-neighborhood scale, or multiple-neighborhood scale. The general practices are that these communities hire waste transport crews that transport their wastes from one household to another to waste transfer terminal that has been made available by their local government. It is from the waste transfer terminals points that the tasks of local government (cleanliness department) start, by transporting the already collected wastes over these points to waste processors or final disposal sites. These waste collectors crews usually serve as recyclable waste collectors as well, to be sold to intermediates (lapak) under current selling prices. In

most cases, mid-to top level income groups will usually give up their used goods to these waste crews. Should they separate their wastes in their respective households; most of them will give up their already separated waste to these waste crews. Therefore, waste collectors in Indonesia get additional income from their waste collecting services, in addition to revenues from recyclable waste sales that generally give higher qualities from recyclable wastes obtain by the scavengers. In compare to junkmen, these wastes collectors have advantage in playing their roles as recyclable wastes collectors. To obtain handcart they need no money, because this vehicle has been made available from their communities they serve and they need not to buy these used goods from their original owners. The only thing that makes them different from waste scavengers are that these waste collectors reside in the area adjacent to the areas of communities they serve, they have clear identities and addresses.

In some Indonesian cities, such as Cimahi (West Java), some communities, sponsored by their city government, build simple recycling centers independently to manage their own wastes. In addition to financing their wastes collectors to collect their community' wastes, they process wet wastes to be transformed into compost. These centers are built at the cities over their surrounding environment, equipped by simple waste processing structures and facilities. Many of these centers are either local government or central government-subsidized centers. The major task of their respective communities are financing and maintaining the continuity of these centers. It is also in these places that their wastes are separated into dry wastes available for sale, wet waste available for processing into compost (biodegradable waste) and rejected wastes are transported to the landfill. Therefore, these waste crews get three types of income sources, i.e, from compost sales revenue, dry recyclable waste sales revenue and their official wages from handling the wastes of their communities. It is this model of waste handling that has been referred to under Law 18/2008 on Waste Management, where any waste handling should be implemented based on 3Rs principles.

5.3. Junkmen (waste traders)

Waste traders are generally found as door-to-door junkmen, who buy varieties of used items. They usually work for *lapaks* who lend them money or cart. Generally, they buy items from each house at a price 10% lower than their selling price to the *lapaks* [7]. In middle to high class residential area, they usually get their items free of charge from the items owners, such as out-of-order irons, blenders, kerosene stoves, shoes and clothes.

Standby junkmen get their items from used goods traders, who come to them directly. They tend to display their goods in fewer quantities than door-to-door junkmen. Based on interviews with standby junkmen in Cimahi [7], that have been displayed their items for 5 years at the location, they revealed that this used goods business is quite profitable, especially when they obtain the items free of charge and saleable as second hand items such as electric vans, irons, water pumps, and woodworking equipments. These standby junkmen start their business with certain capitals by door-to-door searching items. However, after obtaining more and more customers, their finally decide to standby in a fixed sites with the other junkmen (usually at junk markets). Most of them always have aspirations to extend their business to include dealers.

5.4. Intermediates (lapak)

Lapaks businesses are usually equipped with warehouses, with 3-4 workers, and collector/delivery vehicles such as pick-up cars, trucks or carts. The item types vary from cup and bottle packaging plastics, blank/HVS papers, cardboards, newspapers and cans. They obtain these items from scavengers, small gatherers and door-to-door junkmen from their adjacent areas and who serve as their customers based on trust among them.

After receiving items from scavengers, they will collect them in the warehouses that have been partitioned with plastic tarps for each type of item, equipped with several volume plastic drums to store used cans. The usual special treatments to these items before delivering them to the dealers are cleaning the packaging from labels and covers for cup and bottle packaging plastics, milk cans,

and glass bottles. In cleaned conditions, their selling prices at dealer level are higher. For milk cans, *lapaks* sell them to the dealers in uncompleted conditions, but by opening these cans with bottle opener to form sheets to boost their selling prices 50% of their completed states. For other items such as papers and cardboards, *lapaks* pack them by sorting according to the types of papers and cardboards, to be subsequently tied in 1 kg size. They deliver their items on 3-6 days intervals. Total quantities of these items are not fixed, depending on the type obtained, usually in $3m^3$ truck volumes for cardboards, papers, plastics and cans. Their destinations are suited with the specifications of dealer that will accept them, such as plastic dealers, glass bottles dealers, iron dealers and metal or cans dealers, or papers and cardboards dealers. Some dealers domicile outside Bandung City, such as Cianjur and Bekasi for cardboards and cans dealers.

The relationship between *lapaks* as sellers and dealers as buyers are specified under contracts or agreement between both parties, specifying the details of related items, terms of cooperation and items quantities. Frequently, dealers grant *lapaks* loans as capitals to search their items, extend their warehouses, vehicle acquisition or other requirements when they are shortages of their inventories. Money loans are usually granted by dealers to their old customers, such as those who have more than 1-2 years business relationships with the former.

Generally, these *lapaks* businesses are the extension of a business started by someone from scavenger or junkman (small waste traders). Based on interviews over several *lapaks* in Bandung and Cimahi cities, these used goods businesses have started since 5-15 years ago without any legal status as a formal company. *Lapaks* usually are integral parts of the owners' houses or abandoned sites or rented lands. These *lapaks* owners wish that one day they can extend their business to include dealer business, so that they can always keep good relationship with any worker who help them searching their items, and dealers who accept their items to maintain "trust" and enhance sustainable cooperation.

5.5. Brokers

Broker in recycle path could be mostly found as the link between small and major dealer, or between dealers and raw materials processing industries. They work independently (individually) through their relatives or friendships networks, families, or listing by the phones to get buyers and sellers lists. They have authorization to determine the qualities of any item to be issued by the seller and to be offered to the buyers or vice versa. They search items based on buyer requests. For instance, they search these items on dealer's level, in form of colour and transparent PET plastic bottles in pressed conditions for pellet processing industries. Their income comes from commission based on the agreed-upon selling or buying prices.

5.6. Dealers (bandar)

The most easily found dealers in Bandung City are cup packaging plastics and glasses dealers. In addition to iron and metal dealers, and papers and cardboards dealers, there are many plastic dealers in Bandung City, because many plastic recycling factories are loc ated at Bandung City. There are some *lapaks* or dealers outside Bandung City, such as Cimahi, Garut, Subang and Tasikmalaya, who deliver their items to Bandung City. The recycled materials or recycled paper and metal processing factories who usually accept items from Bandung City and its vicinities situated at Bekasi City, Jakarta and Tangerang City. The business scopes of these dealers are not necessarily similar. In general, dealers do further processing for used goods up to the preparation stage of converting raw materials into materials, such as crushing, of cup packaging plastics (polypropylene, PP) and pressing of bottle packaging (polyethylene terephtalate, PET) and pressing and/or grinding food and beverage packaging cans. Papers and cardboards are not usually further processed, because after they have been collected and tied, they are delivered directly to the recycled papers processing factories outside Bandung City, i.e., Bandung District and Bekasi City.

Based on interviews with one dealer at Bekasi in 2009 [1] that serves as ex-packaging plastic dealer, and as owner and industrial manager of pellet and product recycling businesses who started his businesses in 2000s, the strength of dealers to

survive and grow even during weak economic circumstances lies in having wide networks (inner city, outside the city, or even foreign countries), and the availability of supporting equipments such as press machineries, and/or chopping and pelletizing machineries to meet market needs and to secure the qualities of products available for sale. In general, these packaging plastic dealers will promulgate the minimum volume standards to accept items from their peers (dealers) or from *lapaks* inside or outside their cities. For instance, for PP-transparent and transparent/coloured PET of mineral water cups, they usually promulgate 2 tons/weeks minimum quantities, while there is no minimum quantity sandbars ever determined for used lubricant bottles. Due to the fact that these items are usually by-products of the PET or PP.

Based on information from one dealer, other items such as glass bottles are not the special objects of a dealer, because the prices of glass bottles are the lowest in comparison with other items. These glass bottles are collected by these dealers based on their respective trademark and their respective factories and subsequently bought by their original factories.

A used iron and metal dealer at Jalan Soekarno Hatta (Bandung City), revealed that the process of other irons and metals tend to fluctuate. Special treatment applied to irons before delivering them to the related industries are cutting and sorting by their respective qualities. Irons and others metals such as copper wires are obtained from intermediates and gatherers of irons or smaller dealers. The business that has been started since 8 years ago, tough with no legal incorporation, yields Rp. 5,000,000 (1 US$ = Rp. 9,200) monthly average profit or over 30–50 % of their gross revenues. These irons and metals are delivered to automotive factories in Jakarta based on their respective agreements and good, long term cooperation between the dealer owners and industrial workers who have special authorization to procure them. According to the dealer's owner, irons are the used items that have relatively constant selling prices than other products such as plastics.

5.7 Bandar as Recyclers

In some cases, dealers (bandar) in informal plastic recycling activity in Indonesia act as recycler for plastic material processing which is widely known as

pelletizing industry. This bandar serve dual roles, both as dealers and as end users of recycled products, depending on their business scales and the completeness of their own production means (equipments etc) as shown by Padmi et al. (2008), and results of interviews with Baedowy (2009) in the 2009 ERIA Report [1]. It is documented that this pelletizing industry generally needs materials in the form of plastic scraps that should be homogenous by their respective types of packaging. Such PP scraps only or PET scraps only. However, if the industry has grinding machines, it prefers to accept items in pressed form because it will give more guarantee to the qualities of the resulting scraps as export commodities or domestic market special demands. According to Baedowy (2009), if he accepts scraps products from several dealers, then he will frequently find plastic contaminators that will reduce their net weight, such as PVC scraps, PS scraps, iron plates, glasses debris, and aluminium plates within the plastic scraps. If he doesn't resort them through filtering, then the pelletizing machine quality would be impaired, and more rejects occurs, in the form of breakdown of pellet ties. This will cause the entire production processes to be rerun several times and this will ultimately impair the end-products qualities.

In addition, Baedowy also mentioned that the product quality needed to make end product in the form of broom fibers frame are only green, red and blue PET pellet, depending on the broom fibers frames to be produced. To produce plastic balls or children piggybanks, he needs HDPE pellet from used lubricant bottles that he produces as well. Therefore, the most essential thing is that homogenous qualities by the types of packaging plastics originated from his trusted partners plays important role in his successful products and in maintaining his partnerships.

The similar views are expressed by another recycler from production department of one formal enterprise, situated in Cimahi City. This company makes zippers from transparent and collored plastic PET as its materials. It promulgates a criterion that any items it accepts from dealers as its partners should be in forms of PET bottles in pressed forms. The main reason is that its material inventory warehouses has limited areas and that self-processing will guarantee higher qualities of the resulting scraps products, so that it subsequently sort them by their colours, cleaning, chopping and washing through drying.

5.8 Dealers at lumber trading business

The other type of waste/used-goods recycling category is building demolition by-products in lumber trading business. This business is discussed as a separate topic from used item dealers above because it takes different pathway. The interviews with several actors of lumber trading businesses in Bandung City reveal that this business has distinct business scopes, ranging from their sources to their end products.

This type of trading business has been pioneered by lumber business people at Terusan Pasir Koja Street (Bandung) since 10-12 years ago [10]. Based on interview with one of the traders of these goods, items that serve as the objects of their business are used frame lumber from old buildings they obtain through two ways as follows:

- Selling and buying with the owners of old houses/buildings to be demolished in order to obtain lumber from wood frames, roofs, doors and others; and

- Cooperation with construction projects, most of them order wood frames in large quantities, or more widely known as party buyers.

The buying prices of lumbers at the project owner depend on the buildings to be demolished. They will refurnish the collected items by cleaning, repainting and displaying them in front of their stores, to be sold, and not to be delivered unless in job-order cases.

Other lumber businesses collect wood pellet and used frames from lumbers' wastes, to be processed into sofa/chair frames and then deliver them to sofa production factories and other subscribers in Bandung areas. One trading business explained that they have been operating their business since 10 years ago with 5 workers. Low quality and non-reusable lumbers are cut and sold to the tofu factories to be used as firewood. Another lumber businessman explained that he entered cooperation with tofu factories at Cibuntu Street, Bandung City and factories that need firewood, as their consumers. The collected lumbers are cut and converted into firewood.

6. Recycling Efforts and Waste Handling Quality

The problems with waste handling in developing countries like Indonesia are relatively more complex than those problems faced by developed countries. In many cases, non-technical aspects are to be resolved first, such as institutional, financial, and environmental aspects. Also, the local government appreciations in giving their priorities in resolving these issues. The technology used is generally still relatively simple, and in some cases face some barriers in its applications. Therefore, a holistic approach to resolve these issues is urgently required. The impacts of these aspects on the quality of waste services clearly vary, depending, among other thing, on income level and other socio-economic factors of the respective communities.

In Indonesia, waste recycling is an activity highly supported by the entire parties concerned. However, these efforts are not incorporated into actual and integrated activities. Municpal waste recycling activities are performed through community self-help and their local government schemes as mentioned above. The effort that should be performed by the entire parties are how these waste recycling activities in informal sectors could be the integral part of waste handling performed by local government (formal sector) and community's self-help. Simply speaking, the main target of municipal waste handling is how to arrange that any waste generated could be well-handled so that the overall city environment would be clean, and simultaneously any waste generated would not bring negative impacts either to human health or their living environment. Waste generators and their corresponding local governments would be satisfied if these recycling activities could contribute in decreasing their waste problems and at the same time could decrease the cost that should be provided, due to the existence of revenues from recyclable waste sales.

On the other hand, the main target of waste recycling done by people in recycling business activity is how to manage recovered materials to obtain as highest economic value as possible. Waste problems are not their problems. They will be satisfied if they can get as many parts of wastes as possible that have high economic value. They do not care about the remaining non-economic and non-salable part of these wastes. Speaking of wastes handling and waste recycling, we should find the linkage of these two diametrically opposed interests.

The 3Rs efforts in urban waste management are integral part of sustainable waste management concept. The main target of which is to drive community to minimize their waste as possible, and increase the quantities of reusable wastes, safe waste processing and disposal from health and human living environment point of views. On the other hand, recycled goods and wastes trading businesses are basically economic activities, where such factors as prices, product/material qualities, supplies continuity based on their demanded quantities, and the related profit follows current market mechanism. Both interests, i.e. interests in sound waste handling and recycled product business interests, should be well and proportionally bridged so that it would enhance the continuous growth of recycling efforts along with higher qualities of the resulted end-products, and ultimately improve their economic values. It is for these reasons that we need a mechanism that will guarantee the qualities of goods to be traded, through, for example, development of certain quality standards.

7. The Need for Product Standards

The dominant views among Indonesian people, including decision makers, in understanding the 3Rs concept have always been associated with any effort in urban waste management. Either during formal discussions, or in mass media discourses, the 3Rs are always linked with the roles of the community as waste producers, and how this community as wastes producers can participate in these efforts. Other sector that has been discussed in many occasions is the roles of scavengers in the efforts of using the economic values of the wastes. Only in rare cases that these efforts were been associated with sectors of industries and the roles of other informal sectors other than scavengers, such as junkmen, who actually more involved in this field. This is understandable, because we in Indonesia assume that used goods are not wastes at all, and that these goods do not pose any environmental issue.

The path flow mechanism of recyclable wastes and used goods between the seller and the buyer is actually pure market mechanism. These goods are moving from one hand into another due to the very existence of market demands. The sellers supply these goods because their buyers are there. In case of no market demand, then the actual occurrence is that these goods are moving from one hand into another's

due to gifts to anyone who needs them (donation). If these needs do not exist, even for free of charge goods, then these goods would end as wastes and will create negative impact to the environment, because their owner thought that these goods are of no uses anymore and should be disposed.

To process the uses of wastes and used goods which ared mostly performed by informal sectors in developing countries like Indonesia, then it should consider at least the following standards and guidance:

- Market demands;
- Workers safety;
- Environmental standard compliance; and
- International trading.

7.1. The product quality should meet market demands

If these goods are flowing as economic goods, then their buyers will certainly have quality requirements on whatever goods they will buy, depending on their buying power. If they buy these goods to be resold to next buyers, then these goods should meet the quality requirements and buying power of their prospective buyers, and so on, so that it might need more general standards, following market standards that will apply on several locations and occasions. Within each of these chains, their resulted profits should be considered, so that it would be normal if the prices of the same goods will increasingly higher. Like market standards all over the world, recyclable waste trading will follow the same mechanisms. Should the seller is only one, then he or she will set the selling price as highest as possible, and it might be that the quality would not be prioritized by the seller. On the contrary, should only one buyer, then he or she will set the buying price as lowest as possible and set the quality as highest as possible. It is this phenomenon that occurs between scavengers and intermediates or between intermediates and dealers and so on.

In Indonesia, there are some products that have their own predetermined qualities, such as compost products from urban waste composting (SNI for compost criteria). But most of these existing standards are general standards in nature, associated with the uses of materials or as alternative source of energy. In this case,

then recyclable products are thought to be materials or sources of energy. The ilustration below is the example by two following cases:

a. Fly ash and bottom ash: these products are most frequently generateed from coal burning. Chemically, these materials are silicate rich pozzolan. Therefore, these materials are strongly recommended to be used as building materials, such as concrete. In this case, the uses of this materials in Indonesia will be associated with a variety of standards and regulations to be complied with such as:

   - Fly ash and bottom ash belong to hazardous wastes. The storage, transportation and uses require special permission, while their operators should hold special license. Specifically for the uses of these materials, the recycler should first set study report to the State Ministery of Environment at Jakarta, proving that these products will not harm living environment. The common practice is that special discussions should be presented before a specialists team who will authorize and approve or not approve the recycling plan of these materials. There is no standard applies to the processes, including extraction standards of heavy metal (on waste) contents of these materials. The only existing standards are leaching standards.

   - From building materials point of view, fly ash belongs to any other binder materials such as cement etc., which have specified product quality such as silicate contents, cementing speed, and so on, as specified under this specific SNI, and normally will refer to international standards such as ISO or ASTM and the like.

   - In the view of mixed quality as material building in addition to another materials such as concrete, bricks, paving block and the like, then each of these product performance quality has its own standard, such as SNI for paving block, SNI for brick and SNI for mixed concrete.

   - From the overall performance test of the building performance, there is test standard that should be passed, such as concrete regulation of Indonesia.

b. Alternative fuel: the uses of alternative materials and fuel are one option that should be supported in terms of their uses. One of the industries actively involved in using this opportunity is the cement industry. This industry regulates the quality of materials to be accepted. One of the interesting cases is the use of fly ash and bottom ash from coal. While the actual processes within the blower of power generator to produce these by product were well functioning, then we could be certain that these by products could be used as alternative materials for cement producing. Otherwise, improper quality of by products would be resulted, because they will produce carbon residue containing a specified burning calories. If these burning calories are sufficiently high, then these bottom ashes will have double functions: as additional source of materials and as alternative source of energy. Within certain concentration range, however, the remaining carbon contents would be unwanted residues from cement industry point of view, so that they will reject to use this type of bottom ash.

Based on the above illustrations, it is clear that waste recycling as alternative materials or energy requires proper regulations and standards to enhance their added value. We need cross-sectoral coordination, especially among the parties that hold the responsibilities to regulate the uses and trading of these materials. In Indonesian case, we need not only the role of ministries in charge of wastes, such as the Ministry of Public Work and the State Ministry of Environment, but also the Ministry of Industry or the Ministry of Trade and so on.

7.2. Labor safety in product processing

In the case of recyclable and use goods pathways, efforts should be done to enhance their selling process, through selection, separation or reparation and so on. Activities performed in informal sectors in developing countries are pretreatments such as melting process, generally performed without considering labor safety and their impacts on their living environment. In the case of large industries, they usually guard their company images and accordingly comply with applicable regulations in Indonesia. But in the case of small industries, and most prominently among home

industries, most of them belong to informal sectors, usually they have less attention to their labor safety aspects, due to their limitations of capitals and knowledge. It is this issue that should be specially considered by some parties, such the State Ministry of Environment, the Ministry of Human Resources and the Ministry of Health.

7.3 Standards associated with environment compliances

If these goods should have to be disposed off, it will certainly need environmental quality standards, such as emission standards and effluent standards, specifying any goods entering the corresponding environment, so that they will not create negative impacts. In this aspect, the role of MEI would be required. In some cases, however, the application of these regulations requires preparedness and willingness of the entire parties to implement them. It is important that the promotion of law-enforcement must be a priority.

7.4. International goods trading

The regulation of accepted standards on the qualities and performances of a product or goods should be applied in a country, including for recycled materials or products from these recycled materials. For developped countries, depending on their capacities, the experiences and appreciation level of their citizens, these standards will be easy to be set and to be implemented. To protect their consumers, the application of standards on products and goods among developped countries are common practices, not to mention the roles of powerful consumers association's monitoring and the like. This situation give the impetus for eco-labeling concept and similar concepts, that has even greater power in monitoring or judging whether or not a product has been produced from any materials that need processes that will not harm its environment and the human health. Consumers in developed countries have common practices in selecting and buying any product produced from materials, energy and production processes that environmental friendly according to their own standards. On the other hand, producer of similar products applies double-standards, in that they will export the product to meet the quality requirement of the country of destinations, while at the same time the same producers will export the similar product or goods with lower qualities or performances just because the country of destination have not well-

regulated standards. In addition to competitive edge that should be prepared by each country in international free trade, it is also associated with the regulation of the traded products or materials.

8. Conclusion

Waste recycling is an activity that highly supported by the entire parties concerned such as the…..in Indonesia. However, these efforts have not been incorporated into actual and integrated activities. Waste recycling in Indonesia is not new activity. The Indonesian community has long been practicing used goods trading. This trading has been the profession by choice or a profitable business among some people generally belongs to informal sectors. These sectors' activities are done openly and not considered as illegal activities in a day-to-day economic activities in Indonesia.

It is clear that waste recycling as alternative materials or energy requires proper regulations and standards to enhance their economic value. To process the uses of wastes and used goods which are mostly performed by informal sectors, it is important to consider the development of standards, at least the standards and guidance related to market demands, workers safety and environmental compliance. The cross-sectoral coordination, especially among the parties that hold the responsibilities to regulate the uses and trading of these materials is also necessary.

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Abbreviations:

ASTM:	American Standard Testing Materials
GR:	Government Regulation
HDPE:	High density polyethylene
HW:	Hazardous waste
ISO:	International Standard Organization
MEI:	State Ministry of Environment of Indonesia
MPW:	Ministry of Public Works of Indonesia
MSW:	Municipal solid waste
NGO:	Non-Govermental Organization
PET:	Polyethylene terephtalate
PP:	Polypropylene
PS:	Polystyrene
PVC:	Poly Vinyl Chloride
SNI:	Standar Nasional Indonesia (Indonesia National Standard)
3Rs:	Reduce, reuse and recycle