

Role of Waste Bank for Household Personal Protective Equipment (PPE) Waste Treatment and Corporate Social Responsibility in Indonesia

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ABSTRACT

The COVID-19 pandemic is a serious issue the world presently facing. Various ways have been taken to take over this COVID-19 pandemic in hope that the economy of the people affected by this pandemic can be back to increase. On the basis of this reality, this study aims to explore how companies or organizations can utilize their Corporate Social Responsibility (CSR) program funds to help the local community's economy post the COVID-19 pandemic. This study uses the literature review method. The using data collected from online sources such as published journals and online news about healthcare waste management system, waste bank and implementation of corporate social responsibility which related to the waste management treatment. The result of the literature review will be used to propose the model for managing the Household PPE Waste. The results show that Indonesia needs to manage Personal Protective Equipment (PPE) from household and it is recommended to explore the possibility of Waste Bank to manage PPE Waste cooperate with companies and government.

Keywords: *COVID-19, CSR, healthcare waste, management system, waste bank*

1. INTRODUCTION

It has been 1.5 years after the first COVID-19 case was announced by the government of Republic of Indonesia. The number of patients continues to increase and the number of deaths caused by COVID-19 continue to increase. Statistical data related to the number of positive cases, recovered patients, and death due to this pandemic are continuously recorded in a careful manner. Society are trying its utmost effort to protect themselves from being infected with COVID-19. Health Protocol is enforced to minimized the spread of COVID-19, including wearing masks, maintaining distance, washing hands, limiting mobility, and avoiding crowds. The change in the way people live in the current days creates a new impact that directly

impacts the environment, namely the soaring medical waste, including masks, hand soap bottles, hand sanitizer bottles, gloves, and personal protective equipment (PPE). Accordingly, the number of healthcare waste generated increasing sharply during this Covid-19 pandemy. Based on estimation from ADB [1], estimated additional healthcare waste generation in Jakarta, for example, is 212 tonnes/day during Covid-19, increasing 506 % compared with healthcare waste generated before Covid-19.

The Increase in medical waste including personal protective equipment (PPE) waste will be very dangerous if it is not handled in an immediate manner. According to Indonesian law, health care waste management (HCWM) is a part of hazardous waste

(HW) management and regulated by laws and regulations such as Environment Protection and Management related to the hazardous material, and the government regulation indicating the position of HCW as part of a hazardous management approach. The details of HCWM are stipulated in the Ministry of Environment and Forestry (MEF) Regulation as “Procedures and technical requirements for the management of hazardous and Infectious waste from health service facilities”. It regulates how to reduce, sort, store, transport, treat, bury, and dispose of hazardous and Infectious waste. It can be done either by the healthcare facility (on-site) with a permit from the MEF, or by a private company for transportation and treatment/ disposal (also with a permit from the MEF). The technology that can be applied for on-site treatment is autoclave and incineration, while for off-site treatment, the private company can only use an incineration process.

Table 1. Estimated additional amount of HCW in each city due to the COVID-19 pandemic

City	Population (World Population Review)	healthcare waste generated (tonnes/day before COVID-19)	Estimated additional healthcare waste generation (tonnes/day during COVID-19)	Percentage of increase due to COVID-19
Manila	14 million	47	280	496
Jakarta	10.6 million	35	212	506
Kuala Lumpur	10.5 million	35	210	500
Bangkok	8 million	27	160	493
Ha Noi	7.7 million	26	154	492

Source: ADB [1]

The problem that now are facing is because not all the infected people stay at hospital during the treatment or recovering from the Covid-19, and they are isolated at their own house. With reference to the previous research in Polandia (3) regarding the behavior of the people in disposing the personel protecting equipment (i.e face mask and gloves), most of the people dispose the PPE together with mixed waste. This behavior can lead to negative impact for the transmission of the Virus if not managed properly. [2]

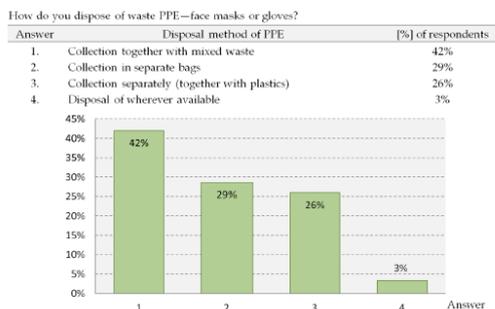


Figure 1. Disposal method of waste PPE

Source: [3]

One of the biggest challenges in Indonesia is that the operational capacity of existing HCW treatment and disposal, even during normal conditions, for both on-site and off-site facilities is lower than the amount of HCW currently generated. In addition, there is a capacity gap on HCWM according to the area of Indonesia. Rural and remote areas are facing a lack of treatment capacities on HCWM, while the amount of infectious waste rapidly increased in the current COVID-19 pandemic situation.(UNEP, 2020). The following proposal to address those issues are raised by MEF:

- Optimize treatment capacity both of on-site and off-site facilities
- Seek collaboration with the cement kiln industry
- Increase the role of local governments in MWM
- Develop HCWM facilities in 2020-2024 in 32 locations, with an integrated monitoring system (5 units by 2020)
- Invite a private company to develop the centralized HCWM facilities in all regions
- Utilize alternative technologies (besides incineration technology)
- Scenarios to increase the treatment capacity include: - If the capacity of private companies increased to its maximum capacity, the total capacity will increase by 2.8 times, though the facilities are still not distributed equally. - If the cement kiln industry can be used to treat COVID-19 waste, the total capacity will increase by 3.6 times; the distribution is relatively equal, but waste transportation will be another problem in certain areas.
- Another treatment/handling for burying and Landfilling (MEF Regulation)
- Another option is to give special permits for the on-site incinerators that are already built, but do not fulfill the MEF criteria, and allow them to accept the waste from other regions that are not listed in the permit.

However, to implement the above plan needs time apparently, and the other hand the needs to manage the household personal protective equipment (PPE) waste should be addressed as soon as possible in order to minimize the transmission of the virus due to the improper treatment.

One of the alternative solutions that can be explored is to encourage Waste Bank that currently operates in many cities and rurals all over Indonesia to be able to manage the household PPE waste. Since most of the Waste Banks currently are not receiving the household PPE waste because they do not have a license

to operate the management of healthcare waste treatment, therefore government need to enhance the capability of the Waste Banks to be able to manage the healthcare waste properly.

The issues that hinder the implementation is that Waste Bank need to be equipped by the required skill of the operators as well as the technology such as incinerators. Since this enhancement capacity need additional budget and Waste Bank has limited budget and government tend to focus for the big HCWM facilities, therefore government can encourage big companies to support this program by using the Corporate Social Responsibility Fund.

Furthermore, one of the Sustainable Development Goals number 12 is Responsible Consumption and Production. Based on 2020-2024 RPJMN Policies for Responsible Consumption and Production, it is an act of improving the quality of the environment so that it can support the implementation of development, for waste handling, for development of green industry, and for improving the performance of reducing and handling household waste and similar household waste, including plastic waste.

Concerning to the above mentioned issues, hence the main objective of the present paper is to make a program to answer SDGs number 12, by increasing the capability of Waste Bank to manage the health care waste, especially personal protective equipment waste, i.e used mask, used gloves, etc. Further, the study seeks to achieve to following specific objectives (1) to analyze how to manage COVID-19 healthcare waste , i.e PPE waste (2) to analyze waste bank program to manage household waste (3) to analyze how corporate social responsibility (CSR) can support waste bank management for covid 19 healthcare (i.e PPE) waste treatment

2. METHODOLOGY

Method used in this paper is literature review. We review literatures studied about healthcare waste management system, waste bank and implementation of corporate social responsibility which related to the waste management treatment. The result of the literature review will be used to propose the model for managing the Household PPE Waste.

The descriptive design was utilized based on the nature and the objective of this study. The using data obtained or collected from online sources such as published journals and news. The framework of the research follows.

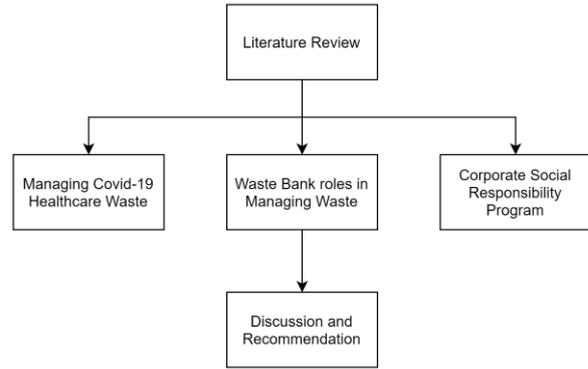


Figure 2. Framework of Study

3.LITERATURE REVIEW AND DISCUSSION

3.1 Literature Review

3.1.1 Managing COVID-19 Healthcare waste

The number of COVID-19 patients in various countries is increasing, it also has an impact on the increase in the amount of COVID-19 waste that continues to increase in various countries. Some countries allow COVID-19 patients who do not have symptoms to self-isolate in their homes. However, COVID-19 patients who have mild or severe symptoms must immediately receive treatment from the hospital. Therefore, COVID-19 household waste continues to increase every day. The waste includes medical masks, non-medical masks, COVID-19 self-test kits, used gloves containing COVID-19 bacteria, food and beverage packaging used by COVID-19 patients and others.

To ensure good medical waste management throughout Indonesia, the Indonesian government has issued a circular letter from the Minister of Environment and Forestry Number 167 of 2020 concerning Management of Infectious Waste, and Letter of the Minister of Environment and Forestry Number 02 of 2020 concerning Management of Infectious Waste and Handling COVID-19 Household Waste. These following are steps can be taken to handling COVID-19 Household Waste for Medical Waste from Hospital [11]:

- store hazardous infectious waste in a closed package for a maximum of two days from the time the waste is generated transport and destroy waste management products using incinerators facilitators or autoclave.
- Incinerator facilitator or autoclave waste is packaged and marked as a Infectious product, then temporarily stored in a Infectious waste storage area before being handed over to the Infectious waste management authority.

These following are steps can be taken to handling COVID-19 Household Waste for Medical Waste with infected person inside the house [11]:

- collect the medical waste such as PPE, masks, and gloves.
- collect COVID-19 waste and store it in closed containers.
- take the Infectious waste to the Infectious waste management authority.

These following are steps can be taken to handling COVID-19 Household Waste [11]:
Household waste

- All waste management professionals are equipped with PPE, especially masks, gloves, and safety shoes which must be cleaned every day.
- To reduce mask waste as a result of the COVID-19 pandemic, the public is encouraged to use reusable masks
- The government reminds the public to tear or cut their disposable mask after they wear it and save it in a safe container before throwing it into the trash to avoid misuse.

According to Sangkham [5], who reviewed several literatures regarding the guidelines and practice in Asian countries, the disposal method to be applied is mostly incineration.

Table 2. Covid-19 Treatment and Disposal in Asian Countries

Country	Covid-19 Treatment and Disposal
Indonesia	Mostly incineration, disinfecting at source and transporting to the disposal site, open burning (if no incinerator) or hazardous waste landfill
China	- Temporary incinerator installation suggested for waste management. - Municipal solid waste incinerators to co-process medical waste in rotary kiln. - Hazardous waste is thoroughly incinerated in high temperature flue gas and slag residue after 60 min of high temperature (850 C) incineration.
Japan	Incineration, melting, steam sterilisation (autoclave), dry sterilisation and disinfection followed by shredding and disposal to sanitary landfills.
Malaysia	Mostly incineration
Thailand	Incineration, autoclave, WMSP (Waste Management Service Provider) sanitary landfill.
India	- Common biomedical waste treatment facility (CBWTF). - Disposal permitted by deep burial only in rural or remote areas without CBTWF facilities. - Large volume of yellow colour-coded (incinerable) COVID-19 waste beyond the capacity of existing CBWTFs and BMW incinerators, necessitates permitting HW incinerators' usage at existing treatment, storage and disposal facilities (TSDFs) or captive industrial incinerators if any exist in the state/union territory. In such cases, ensure separate arrangement for handling and waste feeding.

Source: [4], [5]

Below is the scheme of household management including pre-treatment, segregation, storage, delivery, collection, transportation and disposal from segregation of waste, collection, transportation, and disposal.

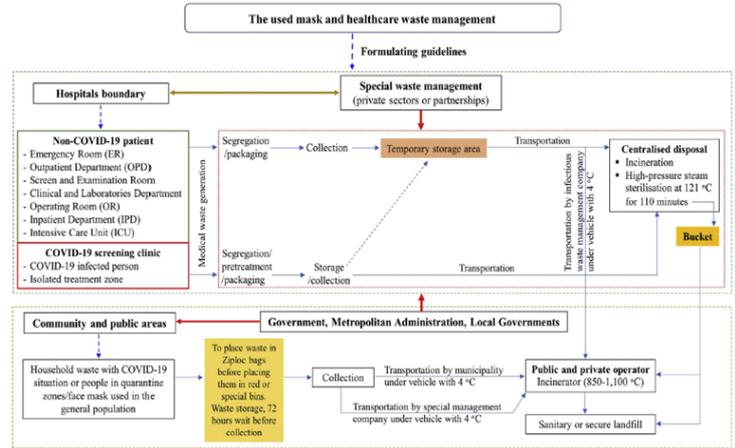


Figure 3. Scheme of Household Management Household Waste Management Frame During Covid-19 Outbreak

3.1.2 Waste Bank Program in Managing Waste

As one of the waste management initiatives, waste bank is creatively applied in various regions in Indonesia. Waste Bank is a merger of the banking concept with 'junk collectors' concept. The Ministry fully supports the manufacture of the waste bank as an alternative solution to the reduction of waste dumped into the final disposal.

To support the activities of waste banks in Indonesia, the government, through Law no. 13 of 2012, also implements the waste bank's integration model with Extended Producer Responsibility; the objective is for manufacturers to take responsibility for recycling as appropriate. The models are also reflected in the activities and benefit from the presence of the waste bank for all stakeholders involved. Their CSR through waste banks is a form of responsibility for the welfare and improvement of people's living standards (social responsibility) and responsibility to the environment because they have managed the natural resources for the benefit of the company.

The focal point of waste bank is the local needs and characteristic, through a communitydriven development. The waste bank implementation in Indonesia can be classified into four business model groups, consisting of savings, health, community entrepreneurship, and energy [8]. WB increases 10 times in 5 years, spread over 30 provinces and 206 districts/cities [7].

As far as we know, there is no waste bank dealing with PPE waste. However, if we study a literature research by Raharjo [7], which discusses whether a WB system may be applied to collect e-waste to support the Extended Producer Responsibility (EPR) program, establishing a model of WB to connect e-waste's sources with the producers and/or recycling agent, the approach probably can be analysis whether the proposed model can be used for managing PPP waste by WB cooperate with companies.

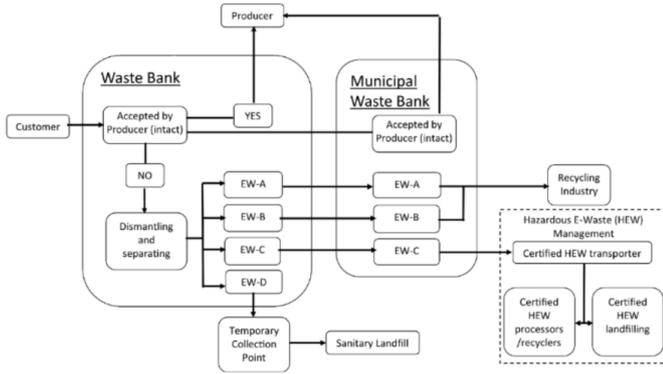


Figure 4. Scheme proposed of e-waste management in Indonesia

Based on the research conducted by Raharjo, et.al [7], it is proposed scheme of e-waste management in Indonesia as below mentioned.

The above proposed scheme involving the cooperation between the community, government, waste bank and companies.

Accordingly, PPE waste is different with the electronic waste, since the PPE waste apparently is not easy to be recycled economically. Therefore, it mostly will be disposed. However, the cooperation between Waste Bank, companies, government and communities can be adopted in managing PPE waste by Waste Bank.

3.1.3 Corporate Social Responsibility (CSR) Support Waste Bank Management for COVID-19 Healthcare

Solid waste generation by different countries are influenced by the rate of industrialization, economic growth, local food habits and climatic conditions. The disposal of these solid wastes is critical to any population, as landfills and mismanaged waste disposition provide breeding ground for harmful vectors and rodents giving rise to potential health hazards. Waste disposal by burning and incineration contributes to greenhouse gases emission, adversely affecting the environment. Studies reveal that despite awareness in solid waste management (SWM), the planning, implementation and execution of SWM in different countries is proportional to its economic development as represented in Table 3 [8].

Table 3. Comparison of SWM by Different Category of Countries

Activity	Low income	Middle income	High income
Costs	Collection costs represent 80%-90% of the municipal SWM budget. Waste fees are regulated by some local governments, but the fee collection system is inefficient. Only a small proportion of budget is allocated toward disposal	Collection costs represent 50%-80% of the municipal SWM budget. Waste fees are regulated by some local and national governments. Expenditures on more mechanized collection fleets and disposal are higher than in low-income countries	Collection costs can represent less than 10% of the budget. Large budget allocations to intermediate waste treatment facilities. Up front community participation reduces costs and increases options available to waste planners (e.g., recycling and composting)
Incineration	Not common, and generally not successful because of high capital, technical, and operation costs, high moisture content in the waste, and high percentage of inerts	Some incinerators are used, but experiencing financial and operational difficulties. Air pollution control equipment is not advanced and often by-passed. Little or no stack emissions monitoring. Governments include incineration as a possible waste disposal option but costs prohibitive. Facilities often driven by subsidies from OECD countries on behalf of equipment suppliers	Prevalent in areas with high land costs and low availability of land (e.g., islands). Most incinerators have some form of environmental controls and some type of energy recovery system. Governments regulate and monitor emissions. About three (or more) times the cost of landfilling per ton

Source: [10]

Problem that could be hindering the solid waste management, especially for low income and middle income countries, is because the high capital required to purchase incinerator as well as operation cost.

To process health care waste, it is need incinerator with temperature above 850 C which is expensive, and Waste Bank

could not purchase it with feasible benefit. Based on research conducted by Purwanta [9], who reserched implementation of small scale municipal solid waste incinerators in Sidoarjo, East Java, it was found that the implementation is not effective since the temperature mostly below 500 C and have harmful effect to the environment. Accordingly, to process the PPE waste need more suitable incinetors and since Waste Bank has a limited capital, large companies can take the opportunity to support the Waste Bank program by using the Corporate Social Responsibility (CSR) Fund.

The corporate social responsibility (CSR) of a company is a commitment that must be fulfilled in accordance of the values and goals that are achieved along the community. By establishing a company in the community, it means that the company also has a direct social responsibility to deal with problems and conflicts that occur in itself. The corporate social responsibility (CSR) program must be able to support the company to minimize the negative impact of the company’s own operations and maximize its positive impact on society. Companies that currently operate will also produce more infectious waste masks and gloves in the future, therefore they have to take a chance to support this program.

Example of the companies in Indonesia that has carried out empowerment-based corporate social responsibility (CSR) activities is PT Pertamina EP. One of the programs carried out by Pertamina in overcoming environmental issues is a waste bank, through the Delima Waste Bank Program [12]. Another company that also implements the waste bank program in the form of corporate social responsibility (CSR) implementation is Bank Danamon Probolinggo through the Maspro Waste Bank program [13], and many more companies have already participate their CSR program in Waste Bank.

3.2 Discussion and Recommendation

Managing the PPE waste is required in order to minimize the transmission of the Virus to the community. As an urgent action plan need to be in place and with considering to several limitation, we recommend that at the initial stage, Companies and Industries participate to manage the proper PPE Waste of their employee during their works in office as well as to participate their CSR program cooperating with Waste Bank and Government. This action plan can reduce the capacity of the healthcare waste management treatment and disposal facility currently overload.

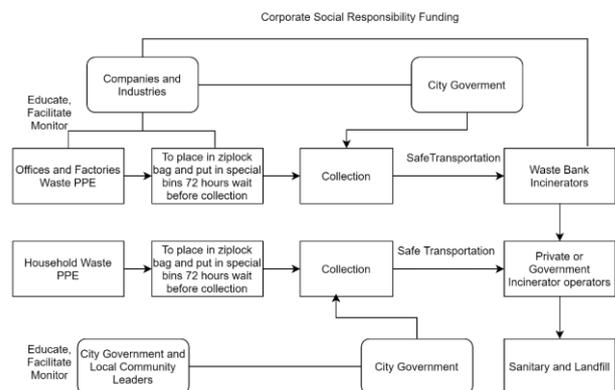


Figure 5. Propose Scheme for PPE Waste Management by Waste Bank with CSR Program

As proposed by the above scheme, the initial stage that designated Waste Bank only manage the PPE Waste

originated by Companies employees with the assumption that the PPE Waste can be managed more easy than household waste management, it is more easy to educate employees to change their behavior to keep the PPE properly. It is also considered less risky in term of the virus transmission compare with the household waste that need more time to change the behavior of the community.

As a consequence, Companies also can support Waste Bank with their CSR program to equipped the Waste Bank with the state of the art technology to treat PPE Waste.

For household waste treatment, it is recommended to be managed by the incinerator government operators or by big private incinerator. The private companies incinerator can cooperate with government with the Public Private Partnership program.

4. CONCLUSION

The purpose of this paper is to make a program to answer SDGs number 12, by COVID-19 Waste bank. Based on the literature reviews, it is important to urgently manage the PPE waste since it can transmit the Virus to the community without proper treatment. Waste Bank that currently have been established in many provinces in Indonesia can be explored for the possibility to support to manage PPE Waste with cooperation with Companies and Government support. Since the technology to process the PPE waste need big investment, it is recommended to initiate the action to process PPE waste originated by the Companies employees who everyday using PPE (i.e face mask) in their office, cooperate with Waste Bank.

For further research, it is necessary to study in more details the technology that more suitable to be applied by Waste Bank in more effective, safe, efficient, as well as environment friendly.

It is necessary to study further also the possibility of Public Private Partnership program to manage healthcare waste management facilities for household healthcare waste.

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