

## CHAPTER 3 RESULTS

### **A. Multilayer Plastic Waste Take-back Initiative as the Research Object**

The research selected three multilayer plastic waste take-back initiatives as the research object: the Green and Clean Program, the Green Warmindo, and Eco-Brick. All program has been implemented across Indonesia and in the City of Semarang. The profile of each program is:

#### ***1. The Green and Clean Program***

Unilever Indonesia through the Unilever Indonesia Foundation has started the Green and Clean Program since 2006. This activity was started in Jakarta to manage waste from its source so that illegal waste disposal is reduced. In 2008, Unilever began to adopt and strengthen the Waste Bank approach to be distributed to various regions in Indonesia. As of 2017, 2,237 Waste Banks throughout Indonesia have helped reduce 4,787 tons of waste to landfill (Unilever, 2017).

This program changes the waste management approach that previously used a linear economy (take – use – throw) approach to a circular economy. It supports the waste bank to collect, reuse, and recover valuable waste for further using or processing. The program gives special attention to multilayer plastic waste by buying multilayer plastic waste regardless of their producers from waste bank. The price is higher than the market price to stimulate collection. The performance of the waste bank is evaluated regularly through incentive and awards (Unilever, 2017).

Unilever globally has committed to reducing the packaging weight of its products by a third by 2020; and increase the use of recycled plastic content in its packaging by at least 25% by 2025. In addition, Unilever also targets that all its plastic packaging will be able to be recycled, reused, or decomposed by 2025 (Unilever, 2017).

#### ***2. The Green Warmindo***

The Green Warmindo is a CSR Program of PT. Indofood CBP Sukses Makmur Tbk (Indofood CBP) Noodle Division. This Program emphasized on education and segregate packaging waste from Indomie Stalls (Warmindo) to be collected and recycled as one of Circular Economy initiative from packaging waste. The initiative

was started in Semarang in 2018 by involving 28 Warmindo around Tembalang sub-district. Indofood assigns an NGO as intermediary organization to train the Warmindo operators, collecting the waste, and transferring to the waste aggregators. The initiative expands to other area in Semarang as well as to Yogyakarta City in 2020 (Indofood, 2018).

To maintain the participation of Warmindo, the program setup incentive system based on the performance of collection and cleanliness of the shop. Indofood expects to build new circular economy from the used packaging because it is a pivotal part. The good quality of packaging waste will produce qualified recycle products. The initiative can recover waste like Indomie packaging or other used products to be clean and have added value. Besides that, Indofood educates the storage systems and time management for waste collection based on agreement with Waste Banks or nearby waste aggregators (Indofood, 2018).

### **3. Eco-Brick**

Ecobricks are solid plastic bottles filled with non-biological waste to make reusable building blocks. It tries to provide solid waste solutions at no cost to individuals, households, schools, and communities. It also known as Bottle Brick (zerowaste.id, 2021). PT. Marimas Putera Kencana decided to promote ecobricks as a community movement because they saw it as potential solutions for their used plastic packaging. Marimas considers partly responsible for the plastic impact to the environment. Marimas introduces Eco-bricks because it is easy to make.

Marimas provides training to those who want to participate in making Eco-brick. The participants must register through the website and make as many eco-bricks as possible. After getting the training, participants can make and collect 100 eco-bricks with specifications of weight between 200-400 grams per bottle. The successful participant must send 100 Eco-bricks to Marimas. In return, Marimas will give a laptop as a reward. Marimas provides 1,000 laptops to attract wider participation. Participants benefit from the reward while Marimas benefits in the form of implementing environmental responsibility and obtaining a corporate image.

## **B. Review of Relevant Documents**

Plastic packaging has been regulated as part of producer responsibility in waste management regulations. The Act No. 18/2008 on Waste Management is the first and highest legal mandate to give waste management responsibility. The producer responsibility is described in article 14 to 16 of the act. The responsibilities include (1) to put a label or sign associated with waste reduction and handling in their product or packaging and (2) to manage the product or packaging that is difficult or cannot be degraded by nature. This obligation is further stipulated in the Government Regulation No. 81/2012 on Management of Domestic Waste and Waste Similar to Domestic Waste.

Basically, the producers are responsible to limit their waste generation and to recycle their waste. In limiting their waste, producers are required to develop plans and programs to limit their waste generation as part of their business activities. Secondly, producers are also required to use decomposable materials. Packaging waste must be minimized to reduce environmental burden. The obligation for recycling includes compiling a waste recycling program, using decomposable materials, and taking-back product and its packaging for recycling process. In the government regulation, the definition of producer is elaborated while in the Act No. 18/2008 is not explained. Producers are defined as business actors producing, distributing, importing, and selling goods using packaging that cannot or are difficult to decompose by natural processes.

The latest regulation that is directly associated with EPR implementation is the Regulation of the Minister of Environment and Forestry No. P.75/MENLHK/SETJEN/KUM.1/10/2019 on Roadmap for Waste Reduction by Producer. This regulation encourages producers to reduce 30% of their waste within the period of 2020 to 2030. The producers are expected to establish planning, implementation, monitoring, evaluation, and reporting to realize their roadmap for their waste reduction. It covers the baseline of targeted waste, milestone, testing of take-back, as well as communication and education to the public. Any targeted products, packaging, and containers must be labelled (compostable, recyclable, and or reusable) to inform the customers. The plan, implementation, monitoring and

evaluation of the roadmap is reported as part of the environmental reporting mechanism.

Three categories of producer are addressed namely manufacturer, food and beverage service, and retail. The manufacturer comprises food and beverage, consumer goods, and personal care industries. The second category is the food and beverage service that includes restaurant, café, catering service, and hotel while the last category, retail, consists of shopping centers, department stores, and traditional markets.

The waste reduction is applied through waste restriction, recycle, and reuse. The waste restriction refers to the use of degradable material and use as minimum as possible. It also pursues by using materials that are easier to degrade by nature. The waste recycling can be achieved by replacing degradable materials and using materials from recycling processes. The waste reuse as final option is defined as using materials multiple times within the production process. Further detail of reduction strategy is elaborated in Table 4. Aside from the above obligation, producers must insert waste and product take-back after its lifetime with provision of infrastructure.

The government at any levels may establish incentive and disincentive to the producer in the form of award, public information on performance rating, or in other types of incentives. While the disincentive is in the form of the publication of performance rating.

Beside the regulation associated with waste management, EPR implementation on plastic packaging is connected to food safety. The reason behind the selection material for packaging is the safety aspect of the product. The state guarantees the food safety in the law and regulation including in Law No. 18/2012 on Food, the Government Regulation No. 86/2019, and the Regulation of the Drug and Food Control Agency No. 20/2019 on Food Packaging. Under the Law No. 18/2012, food safety is defined as conditions and efforts needed to prevent food from possible contamination of biological, chemical, and other objects that can disturb, harm, and endanger human health and do not conflict with religion, belief, and community culture so that it is safe for consumption, as stated in the article 1.

Table 4. Summary of the Road Map for Waste Reduction by Producers

Product & Packaging Type	Restriction	Recycle	Reuse
<b>Manufacturer</b>			
1. Polyethylene (LDPE & HDPE)	<ul style="list-style-type: none"> <li>○ Plastic and ink printed labels on PET bottles must be replaced by emboss.</li> <li>○ Size of a plastic bottle for food is 200 g.</li> <li>○ Size of a plastic bottle for beverages is a minimum of 1 litre.</li> <li>○ Plastic bottles for consumer goods are 500 ml minimum.</li> <li>○ Shampoo and soap bottle are minimum 500 ml</li> </ul>	<ul style="list-style-type: none"> <li>○ Using 100% recyclable materials</li> <li>○ Using 50% recycled content from the produced packaging</li> <li>○ Making a close loop from the same packaging waste</li> <li>○ Using collected packaging for open loop recycling.</li> </ul>	Using HDPE packaging that can be reused
2. Polyethylene terephthalate (PET)	<ul style="list-style-type: none"> <li>○ Plastic and ink printed labels on PET bottles must be replaced by emboss.</li> <li>○ Beverage is produced with minimum 1 litre volume.</li> </ul>	<ul style="list-style-type: none"> <li>○ Using uncoloured plastic bottle for mineral water</li> <li>○ Using 100% recyclable materials</li> <li>○ Using 50% recycled content from the produced packaging</li> <li>○ Making a close loop from the same packaging waste</li> </ul>	Using PET packaging that can be reused.



		<ul style="list-style-type: none"> <li>○ Using collected packaging for open loop recycling</li> </ul>	
3. Polyvinyl Chloride (PVC)	Restricting to use PVC for product, packaging, and container by 1 January 2030.	<ul style="list-style-type: none"> <li>○ Using 100% recyclable materials</li> <li>○ Using 50% recycled content from collected packaging of own product</li> <li>○ Close loop</li> <li>○ Open loop</li> </ul>	Using reusable packaging materials.
4. Polypropylene (PP)	<ul style="list-style-type: none"> <li>○ Banning the use of flexible plastic (sachet) with size less than 50 ml or 50 gr starting from 1 January 2030</li> <li>○ Banning the use of plastic straw in the packaging starting from 1 January 2030.</li> </ul>	<ul style="list-style-type: none"> <li>○ Using single layer for sachet</li> <li>○ Using 100% recyclable materials</li> <li>○ Using 50% recycled content from collected packaging of own product</li> <li>○ Close loop</li> <li>○ Open loop</li> </ul>	Using reusable packaging materials.
5. Polystyrene (PS)	Banning the use of PS for product, packaging, and container by 1 January 2030.	Using 100% recyclable materials	Using reusable packaging materials.
Food & Beverage Service			
Single Use Plastic form: 1. Polystyrene (PS) 2. Polypropylene (PP) 3. Polyethylene (PE)	Banning the use of plastic shopping bags, plastic spoons, plastic forks, and other related tools including straw by 1 January 2030.	<ul style="list-style-type: none"> <li>○ Using shopping bag from other materials that can be recycled</li> </ul>	<ul style="list-style-type: none"> <li>○ Using shopping bags from other materials than plastic.</li> </ul>

		<ul style="list-style-type: none"> <li>○ Using eating and drinking tools from recyclable materials</li> <li>○ Using eating and drinking tools form 50% recycled content materials.</li> </ul>	<ul style="list-style-type: none"> <li>○ Eating and drinking tools that can be reused.</li> </ul>
Retail			
Single Use Plastic Bag from Polyethylene	<ul style="list-style-type: none"> <li>○ Banning the use of single use plastic shopping bag by 1 January 2030</li> <li>○ Selling product without packaging or container from materials that is difficult to degrade by nature</li> <li>○ Selling products with a wholesale system.</li> </ul>	<ul style="list-style-type: none"> <li>○ Using shopping bag from other materials that can be recycled</li> <li>○ Using plastic shopping bag that can be recycled</li> <li>○ Using plastic shopping bag with 50% recycled content</li> <li>○ Selling products with recyclable packaging or containers.</li> </ul>	Using multi-uses plastic bag

Several standards are applied to ensure food safety including standards for food packaging and guarantee of food safety and quality. Food safety is further explained in the Government Regulation No. 86/2019, consisting of food sanitation, regulation of food additives, food irradiation, standard for food packaging, assurance of food safety and quality as well as halal issues. The following description will only focus on the standard for food packaging.

The food packaging is defined as material used to cover and wrap food either directly or indirectly in contact with food. The materials for packaging must not be harmful for human health. If the food packaging is in contact with the food, the material must be safe and fulfil the migration limit requirement. The use of food packaging material that contains food contact substance is restricted when it is potentially harmful to human health. The food packaging procedures must also meet the following requirements:

- a. able to protect and maintain food quality from external exposure,
- b. resistant to any treatment along processing, food transportation, and distribution,
- c. able to protect food from contamination, prevent damage, and allows good labelling, and
- d. food packaging materials should be stored and handled in hygienic conditions and separate from raw materials and end products.

More specific requirement for multilayer plastic packaging is described in the annex of the regulation and is attached to the annex of this report.

Another aspect to control plastic waste can be obtained from the environmental management where the government has a strong position through the Law No. 32/2009 on the Environmental Management and Protection. The research focuses to explore on the environmental funding where it is explained at the incentive chapter. Environmental funding is a system and mechanism for collecting and managing funds used for financing environmental protection and management efforts. Environmental funding comes from a variety of sources. Environmental Funding is one of the Environmental Economic Instruments, which has been further regulated in PP No. 46/2017 concerning Environmental Economic Instruments.



In 2018 the government issued a Presidential Decree No. 77/2018 on the Environmental Fund Management. It regulates the collection, nurture, and distribution of the environmental fund to protect and manage the environment. The instrument consists of market, banking, and fiscal instruments to collect and to grow the fund. The fund can be distributed for carbon trading, loan, subsidy, grant, and other mechanism. In 2019 and 2020, the Ministry of Finance released several regulations (MoF No.137/PMK.01/2019, No. 182/PMK.05/2019, No. 779/KMK.05/2019, No. 124/PMK.05/2020, and No. 133/PMK.05/2020) to establish and operate the entity to manage the fund called Badan Pengelolaan Dana Lingkungan Hidup (the Environmental Fund Management).

All the regulation gives new opportunities to environmental stakeholders to access in term of carbon trading, loan, subsidy, grant, and other mechanism to manage the environment from pollution and destruction.

## **B. Review of Relevant Archives**

The relevant archives are accessed from the report of Bina Karta Lestari (BINTARI) Foundation program: Improving Recycle Capacity of Waste Management Stakeholder through Integration of Extended Stakeholder Responsibility (PILAH). The PILAH Program conducted the meeting, workshops, and interview with several stakeholders, especially the producers. Some archives have been collected and reviewed.

### **1. PT. Marimas Putra Kencana**

Address : Kawasan Industri Candi Jalan Candi I Blok D21, Purwoyoso,  
Kec. Ngaliyan, Kota Semarang, Jawa Tengah 50146

Date : 4 Sept 2019 and 27 November 2019

Source : interview and website

Interviewee(s) : Haryanto Halim (CEO) and Lantip (Community Relation Officer)

PT. Marimas Putera Kencana has given attention to the impact of plastic waste to the environment. As a producer of food and beverage plastic packaging, Marimas considers partly responsible for the plastic impact to the environment.

This responsibility was first realized through the Empty Packaging Exchange Program for Marimas retailers. This program is intended to reduce Marimas packaging waste that is disposed of by retailers. The empty packaging is returned to the factory and managed through Marimas Waste Bank partners for reusable products.

Evaluation of the used packaging reuse is considered inadequate to solve the plastic waste problem because sooner it cannot be reused anymore. The reusing process that is expected to extend the life cycle of the plastic packaging waste is quite short. In addition, reused products are also not easily accepted by the market while the production can only be manufactured by people with special or creative abilities. To reach broader stakeholders, where everyone can manage their own plastic waste, Marimas introduces Eco-brick.

Marimas also concerns the upstream where plastic materials are designed and manufactured as packaging. The efforts to replace plastic packaging until now have been facing difficulties because of food safety reasons and price. Alternative materials are very difficult and / or expensive while producers do not want to take risks with materials that have not been proven. Unproven materials can cause damage to food due to water or oxygen contamination. Plastic is still the most efficient and safe material to guarantee food quality to consumers.

Plastics are harmless but careless disposal is the root cause of plastic problems. Marimas reduces the amount of plastic waste in the packaging process. The double plastic packaging has been reduced into single product wrapping. Marimas is still waiting for consumer response to this measure. Marimas expects consumers to take responsibility toward their plastic packaging waste by disposing in the proper waste bins.

The company policy to manage plastic packaging at the design level still plays a very small portion. The first is to reduce wrapping from double into single wrapping. The second policy is to take-back post-consumption plastic packaging. Plastic packaging waste collected from take-back initiatives is sent to waste bank partners to be used as reused products. However, this process has limitations due to limited skills of waste bank members as well as short extension of plastic life cycle. Learning from this process, the initiative for making Eco-brick is launched. With

Eco-brick, plastic packaging is stored and kept in a bottle. It does not need a special skill to make it so that anybody can participate.

Eco-brick targets school students and teachers to collect its plastic packaging waste and return it as Eco-brick. Marimas provides training to those who want to participate in making Eco-brick. The participants must register through the website and make as many eco-bricks as possible. Besides schoolteachers and students, Marimas also introduces Eco-brick to government institutions, NGOs, and religious institutions. Up to present, Eco-brick training participants reached more than 5,000 people in the Central Java and Yogyakarta Special region. After getting the training, participants can make and collect 100 eco-bricks with specifications of weight between 200-400 grams per bottle. The successful participant must send 100 Eco-bricks to Marimas to be rewarded with a laptop. Marimas provides 1,000 laptops to attract wider participation. Participants benefit from the reward while Marimas benefits in the form of implementing environmental responsibility and obtaining a corporate image.

By the end of 2019, more than 200 schools have been registered as participants; only 4 and almost 5 schools have sent 100 Eco-brick. Thus, only four and nearly five laptop units have been awarded (until September 2019) to the participating schools. So, the effectiveness of the initiative from January to August is only 0.4%. With a weight of one Eco-brick between 200-400 grams, 100 Eco-brick weighs between 20- 40 Kilograms. The collection target ranges from 20-40 tons while the collected plastic packaging waste reaches only 80-160 kg. The collection fee is calculated from the incentive cost of a laptop with prices ranging from 2.5 - 3 million IDR. With a weight of between 200 - 400 grams, the cost of collecting plastic packaging waste per kg ranges from 75,000 - 150,000 IDR. The cost per package cannot be calculated because of the large variety of packaging. In general, one kg of waste consists of 500 sachets. So, the cost of collecting is very high compared to the cost of plastic packaging. Eco-brick which has been collected in the Marimas factory (400 units) is currently arranged as a table and chairs. If the participation is large, Marimas plans to use it as a building on the factory site. The main challenge comes from the school bureaucracy such as the exam schedule. On the part of the Ministry of Education, it is very supportive because with the

communication of the Ministry of Education, the program can reach many schools. Marimas has communicated via WA to update schools that have registered but progress is still limited. The involvement of school communities such as teachers and students are also still low. While other opportunities have not yet been identified. All these initiatives will be evaluated to determine their sustainability.

The main challenge is coming from school administration such as to permit, school annual schedule etc. National education Agencies support the initiative and by communicating with them, Marimas can reach many schools. Marimas communicates with the school via WhatsApp to update the status of the school who has registered; however, the progress is limited. The involvement of teachers and students is still low. Besides, the response of parents influences the image of the program. Some parents are suspicious that this initiative is only a marketing approach to foster students to purchase Marimas products. This understanding makes some parents raise a complaint to schools and reject the initiative. Marimas has explained the marketing budget and this initiative is coming from a different budget line. Marketing activity does not target schools but rather to shops and retailers. Up to now, another opportunity cannot be identified yet the performance of the initiative will be evaluated first before deciding any options and next plan.

Marimas will evaluate the initiative at the end of the year so that next year's plan cannot be concluded. The initiative refers to last year's plan that was implemented for one year so the next year (2020) the initiative could be different. The evaluation will determine the next initiative.

## **2. PERSADA Foundation for Unilever Indonesia**

Address : Jl. Ring Road Barat, Baturan, Kec. Gamping, Kabupaten Sleman,  
Daerah Istimewa Yogyakarta 55291

Date : 23 December 2019

Source : interview, website, and online news

Interviewee(s) : Bernadetta Widiandayani

This program was initiated by Unilever Indonesia in 2001 to improve waste collection and recycling due to high waste production and landfill disposal. It aims

to empower the community in handling domestic waste through waste segregation, composting and greening activities. The initiation began with the development of the concept of a waste bank in 2008, by strengthening the model, system of establishment, development, and success stories of its management. The results of this activity are in the form of a Waste Bank System Guidebook and 10 Success Stories. In 2015, the program was expanded to 18 districts/cities including Medan, Jakarta, Bogor, Depok, Bandung, Yogyakarta, Magelang, Surabaya, Lamongan, Sidoarjo, Bali, Balikpapan, Banjarmasin, Makassar, Maros, Manado and Raja Ampat. The city of Semarang began to receive the program in 2017 and continues until the end of 2019. Unilever and the Environmental Agency select potential waste banks while Unilever also selects Persada, an NGO, to support selected waste banks. Implementation in Semarang is an extension of the previous initiative. Waste banks receive training and visit. In 2017 total participating waste banks were 37 and in 2018 increased to 40 waste banks. In 2019 total participating waste banks are 50.

Unilever supports waste banks to collect more waste, not only Unilever's product waste to give a wide impact on the initiative. The initiative aims to give benefits beyond the company interest and to give impact to the environment. Supporting waste banks is the main priority because it also gives economic benefit to the community besides improving awareness of the environment. Beside policy in post-consumption, Unilever Indonesia also runs an initiative in improving packaging design by increasing the level of recycling material/content in product packaging. This initiative launches to cover general domestic waste. All types of waste are targeted including multilayer plastic and even organic waste at the beginning of its implementation. Even so, in the end, inorganic waste is more valuable, which in turn is collected because of economic value and ease of sales. This initiative is also inclusive, meaning that all types of waste will be collected, not only waste from Unilever Indonesia's product brands. The program beneficiaries are waste bank operators and managers. The selected waste banks are those that have been established and are operating. In consultation with the Semarang City Environmental Agency, potential Waste Banks are selected. In 2017, this program supported around 30 waste banks while in 2018 it increased to around 50 waste banks. In 2019, the program will support 60 waste banks in



Semarang. Not all waste banks supported in 2017 continue in the following years, depending on their performance based on the program evaluation. This program provides support in at least two ways; providing training to motivate waste bank operators and financial incentives according to waste bank performance. The program organized waste bank operators and managers to educate households to sort their waste and send it to the waste bank. Detailed technical information on sorting and linking to the market is not provided. The second important support is providing financial incentives based on the performance of the waste bank. Waste banks are rated as platinum, gold, silver, and bronze using a formula of recycling material collection, customer, handy-craft products, and so on. At the end of the year, the waste bank gets an incentive or reward in cash according to its rating. The reward fund is used to increase waste bank business or for capacity building.

With these two supports, the performance of the supported banks has improved. In 2017, the 37 supported waste banks successfully collected 40.76 tons of recycled material. In 2018, 40 supported waste banks collected 125.53 tons of recycled material, while in 2019 with 50 waste banks, the collected recycled material is 177.45 tons. Unfortunately, the collection of multilayer plastic did not reach the target and could not be sent to the pilot processing plastic factory. Unilever Indonesia has been collaborating with a German Fraunhofer Institute to develop CreaSolv, a new technology to recover and process multilayer plastic. It is to separate between plastic material and non-plastic from multilayer plastic. The recovered plastic material is further processed for new packaging so that it can carry out a circular economy with a closed recycling system. The packaging is processed into packaging again. The collection of multilayer plastic in Semarang cannot fulfill both the target and the economic scale of transportation to Sidoarjo where the factory lies.

While Semarang waste banks are not yet successfully sending material, Yogyakarta waste banks have collected four tons of multilayer plastic a few years ago. However, the following transshipment does not occur. In fact, CreaSolv has a capacity of four-ton multilayer plastic per day. At the same time, CreaSolv plastic processing is not yet successful so that material in the factory cannot be processed. Now Unilever Indonesia is cooperating with PT. Wahyu Jaya Sejahtera in



Mojokerto East Java Province to receive recycled materials from supported waste banks. This cooperation is focusing on High-Density Polyethylene (HDPE) plastic that is generated from shampoo, liquid soap, and hair conditioning products. Persada as an implementing partner of Unilever Indonesia has conducted an evaluation of the cost-efficiency of the program. Collection cost is estimated at 7.000 IDR per kg of waste. Cost efficiency for specific waste (Unilever Indonesia product) cannot be calculated because a fraction of Unilever Indonesia products is not surveyed.

Although the performance of the supported waste bank is quite successful with the collection of recycled materials, this is not enough to make the waste bank economically liable. Limited scope/coverage of waste banks is the main reason. With limited household supplies, a waste bank cannot generate high income. Secondly, Persada sees a big gap in the value chain between a small waste bank and recycling companies. There are still many actors playing in between that reduce waste bank profit margin. There is a lack of governance in the process of collecting recycled materials that make small waste bank in a low bargaining position. This gap is being used by waste traders (one of the informal sectors) to take advantage and profit for their business.

The above situation, however, creates a new opportunity for the Unilever Indonesia program to improve. Persada and Unilever Indonesia are focusing on the improvement of the value chain between small waste bank and recycling company by establishing an intermediary organization or waste bank that collects recycle material from a small waste bank and later transports it to a recycling company. By looking at the potential and opportunities above, Unilever Indonesia is most likely to focus on developing a high-level waste bank to be able to provide more margins to small scale waste banks (units). This means that the small bank must continue its operation to ensure feeding to a high-level waste bank.

### **3. BINTARI Foundation for INDOFOOD Sukses Makmur Noodle Division**

Address : Jl. Ring Road Barat, Baturan, Kec. Gamping, Kabupaten Sleman,  
Daerah Istimewa Yogyakarta 55291

Date : 27 November 2019 and 10 February 2020

Source : interview and minute of workshop

Interviewee(s) : Suro, Arief Khristanto, and Nurokhim

PT. Indofood CBP Sukses Makmur, Noodle Division produces many types of noodles such as instant bag noodles, instant cup noodles, mug noodles, and snack noodles. The popularity of Indofood instant bag noodles creates high demand in the market. Consequently, it produces a high amount of multilayer plastic. The internal survey indicated noodle instant products generated 7 billion packages in 2015. This number is estimated from total production and absorption by the market during the period. To handle this waste, PT. Indofood CBP Sukses Makmur Tbk, Noodles Division initiated to assess the feasibility to recycle instant noodle packaging in cooperation with BINTARI Foundation. The assessment was conducted in Semarang as a model area with a focus on instant noodles and Styrofoam Cup Pop noodles for the Semarang market. The assessment showed that instant noodles packaging of Indofood contributed 12% of total plastic waste in Semarang.

Indofood's commitment to environmental management, especially related to plastic packaging, is carried out in at least three approaches. First, Indofood is developing degradable plastic packaging. This degradable plastic has been tested and can be degraded within six months. But this material needs a temperature exposure of at least 400C. Second, Indofood develops a take-back scheme for Indofood instant bag noodle packaging waste through Indofood Food Stalls (Warmindo). This policy has been applied in Semarang for the last two years and has been extended to Yogyakarta. In addition to the exclusive policy, Indofood also supports inclusive waste collection to collect and process waste in general. This third policy is carried out by supporting the establishment and operation of the waste bank around the factory site. Until 2019, Indofood has supported four waste banks. Among Indofood's various products, instant bag noodles from various brands have the highest fraction reaching 12% while cooking oil packaging is 9%. Indofood conducted a survey to identify potential hotspots that dispose of waste the most. As a result, Warmindo is the largest waste source compared to other hotspots. Based on this study, Indofood's focus is to take-back instant bag noodles from Warmindo.

Indofood organizes Warmindo that mostly lies and is concentrated in and around university campuses. The participating Warmindo gets information about the program and training on waste types, its value, and its sorting. To attract Warmindo participation, Indofood 56 Strategy & Mechanism for Public-Private Collaboration on Plastic Waste management launches an incentive base on waste packaging collection effectiveness that is determined by the ratio between collected and purchased instant bag noodles in the participating Warmindo in a month. Indofood appointed local partner, BINTARI Foundation, to inform, motivate, and educate Warmindo workers, as well as to collect and transport recycle materials from each participating Warmindo to a recycling company.

Along with six months of implementation in Semarang, BINTARI has cooperated with 34 Warmindo in and around the Diponegoro University Campus. BINTARI successfully collected more than 700 kg of multilayer plastic. Collection cost per kilogram instant bag noodle packaging is 27,000 IDR if it is calculated with a dedicated scheme. In practice, BINTARI also collects other recycled materials such as PET bottles, paper, and cans. When considering other types of waste, the collection is reduced to 4.000 IDR per Kg of recycling materials. This program has been extended to the UNNES campus that covered 30 units of Warmindo. The program is then expanded to Yogyakarta where more Warmindo is operating.

The high collection cost is caused by the lightweight packaging. One kilogram of recycling material consists of at least 500 instant bag noodle packaging with a large volume. The distance between Warmindo and the storage also contributes to the high collection costs. To reduce collection costs, in the expansion of the program in Yogyakarta, the collection mechanism was changed by connecting Warmindo with the nearest waste bank so that collection was based on market mechanisms. This reduces collection costs while providing supplies to the waste bank that will support its sustainability.

Warmindo is a food stall that sells not only noodles but also other foods and beverages. This shop also not only sells Indofood products but also other producers. Observation from the recycled materials collected from Warmindo shows that there are divers of waste type and producers' products. There is paper waste, cans, PET bottles and instant beverage sachets. According to its brand, there are also food and

beverage products from other food and beverage producers. It indicates that Warmindo is not only an Indofood packaging waste hotspot but also another food and beverage producer. It generates an opportunity that the value of collected materials is higher than the price of instant bag noodles. Another opportunity is that the involvement of other producers can be approached so that net collection costs can be reduced from selling the recycled materials and subsidizing other producers.

Based on the experience in Semarang, BINTARI designs a collection scheme in Yogyakarta differently. Warmindo is educated to sort and collect their waste, but the collection is conducted by linking Warmindo with the nearest waste bank. Implementation of the program in Yogyakarta shows adaptive management to improve collection cost efficiency. Collaboration between a waste bank and Warmindo has the potential to increase sustainability. Especially if this is related to the fact that the waste collected is not only from Indofood. Other food and beverage producers can participate in the same or similar hotspots thereby increasing the effectiveness and efficiency of collection. Potential hotspots like coffee shops, retailers, food stalls, in general, need to be investigated further to assess their feasibility in connecting with a waste bank. However, it creates a new challenge where a small waste bank cannot accommodate the volume of recycled material from Warmindo. Many small waste banks do not have storage, operate with limited capital for procurement, and therefore operate on a few occasions; one or two per month. This system is not appropriate to cover Warmindo waste. Another challenge of collecting multilayer plastic is a low accumulation of waste collection while the storage in most of the waste banks is limited or even not available. Recycling companies that are able to process multilayer plastic are not many. The most appropriate recycling company lies in Sidoarjo, East Java Province. This recycling company in Sidoarjo can process multilayer plastic into a gutter carpet. To transport them to a recycling company on an economic scale, it needs a long time to fulfil its quota. Moreover, the price of multilayer plastic is still very cheap; in the range of 300-500 IDR per Kg. Without subsidies from producers, it is very difficult to continue collecting multilayer plastic waste. Small waste banks with limited storage and financial capital tend to ignore multilayer plastic to keep their business running.

Indofood has the plan to expand in other regions within Semarang as well as out of Semarang. Jogjakarta has been selected as a replication area as well as Surabaya. The plan is prepared to improve the current mechanism; strengthen the economic viability by improving effectiveness and efficiency. Modification or adaptive management is adopted by learning from the implemented activity.

### **C. Results of the Interview to the Relevant Actors**

The result of document and archive reviews have given important and significant information about the role and responsibilities of producers. The focus of the interview is to identify and explore the role, responsibilities, and experiences of actors in the collection, reuse, and recycle stages, referring to the evaluation framework as illustrated in Figure 2.

There are several types of actors that are involved in the waste collection such as waste picker, waste bank, retailer, waste trader, aggregator, etc. This research explores representatives of waste collection actors both who are participating and not participating in the take-back initiatives. Details of the response toward the questions above are summarized below.

#### **1. UD. UNTUNG LANCAR**

Address : Jl. Kertanegara No. 15, Wujil Village, Ungaran,  
Kab. Semarang, Jawa Tengah

Date : 8 October 2020

Interviewee(s) : Buang Harjito and two workers

UD. UNTUNG LANCAR is an aggregator of recycled materials. This company is in the second or third level of the value chain from customer or waste picker. The business model is to receive recycled materials in simpler categories and separate into more detailed classification. By separating in more detailed classification, the company gets reasonable profit to manage its labour. The recycle materials are received from small aggregators, waste pickers, and companies/waste producers such as department stores and manufacturer companies.

The aggregator company receives plastics, papers, and metals however plastics are its specialization. It receives many kinds of plastic including PP, PE,



HDPE, LDPE, PET, and multilayer plastic. Each type of plastic is further reclassified e.g. PP is sorted into another six categories. One of the categories is 'PP gila' that refers to multilayer plastic that contains a PP layer with other types of plastic. This aggregator also receives 'PP sablon', a PP plastic packaging with printed colors. However, this aggregator cannot receive multilayer plastic with non-plastic layers such as sachet of coffee, instant beverage, and energy drink because of its aluminum layer. Some people sometimes look for sachet packaging, but they are used for burning materials in the essential oil refining small scale industries.

This aggregator gives a higher price (Rp. 1,200 per kg), compared to other aggregators, for multilayer plastic packaging because of its specialization and collection volume. A large space for sorting and high financial capacity have made this aggregator collect multilayer plastic in an effective and efficient way. This aggregator does not participate in the take-back initiatives, but many waste banks and small aggregators send their recycled waste here.

Collecting multilayer plastic packaging is not a big problem for this aggregator because it does not collect directly at first hand. The biggest challenge is for actors collecting multilayer plastic packaging at first hand because they are small, light, and cheap. The waste picker will not collect multilayer plastic packaging while other materials are still at a good price. The waste picker and other actors at first hand will only collect multilayer plastic when other materials are not available, or the price drops to a very low level.

This aggregator has been established and operated for 20 years and no big challenges have been faced. The fluctuation of recyclable materials is a normal situation. The aggregator understands about the plastic waste problem recently. To improve the collection rate of multilayer plastic packaging, the aggregator suggests to producers to avoid producing multilayer plastic packaging with non-plastic layers. Producing multilayer plastic packaging with combinations of different plastic types is still acceptable for recycling. The aggregator also suggests that in promoting waste management in the community, economic benefit is not the only motivation because the price is very low. Other benefits should be promoted such as cleanliness and environmental benefits. The role of a waste bank is important to make the collection rate of recycling material improve.



## **2. Warmindo BURJOHOLIC 5**

Address : Jl. Jati Raya No. 8, Pedalangan  
Banyumanik - Semarang

Date : 14 October 2020

Interviewee(s) : Didi

The Burjoholic group was established and started business in 2011. It has participated in the Indofood EPR Green WARMINDI program since 2018 because the waste is part of the Warmindo problem. Mr. Didi as owner of Burjoholic Group feels responsible to manage its waste. The motivation of Warmindo shops to sort and collect their waste is up and down because the activity is a routine: sorting, collection, and evaluation meeting almost every month. Most inorganic waste can be recovered and sent to the program. Only a small fraction of sachet (around 5 to 10%) is not collected because it has no economic value. The sachet is normally beverage packaging with plastic and aluminum layers. The organic waste is also not collected and treated. Finally, sachets and organic waste are disposed of in the waste bins.

The program has been running for three years. Basically, all Warmindo workers/operators have known the way to sort and collect the waste. In the beginning, they have difficulties in recognizing the difference of waste especially plastic waste but later with informative meetings and training, workers can recognize the difference of waste according to its type. It has now become a procedure. Before participating in the program, they do not understand the economic value of waste, so the waste was just thrown in the waste bins. When a scavenger comes, the waste bin is spilled out to retrieve valuable waste. The Warmindo workers must clean up to maintain the cleanliness and hygiene around the shop. It makes them have extra work. It benefits Warmindo when they are participating in Green Warmindo.

Another benefit of the program is from the selling of valuable waste. However, it is very small therefore it becomes a savings that will be withdrawn annually. Last year Burjoholic only got Rp. 900,000. Burjoholic expects to get additional advantage such as reward for example in terms of noodle price discount. So far, the reward is

cooking equipment, fan, etc. the reward also based on volume of the collected waste. Therefore, only big shops usually get the reward, but small shops with low sales will not get any benefit except from the annual saving. The reward system should be refined to allow appreciation for all the effort that has been made by the participants. Otherwise, small shops will not participate and at the end reduce the commitment of others.

In the launching of the program, Indofood promised to give a special price for the Indofood product to Warmindo that is active in the program but there is no realization until now. To make the program work continuously, all actors involved in the supply chain must get benefit. Warmindo, BINTARI, and Indofood must have benefited from the activity to ensure the program was running. As Mr. Didi explained, he heard that the program has been reported to DLH by Indofood as part of their compliance. So, he concludes that Indofood gains a benefit from the program.

Another potential improvement is the provision of waste collection facilities. It will be good to improve the performance and image of the program if producers support the facility such as waste bins. However, the provision of waste sorting and collection infrastructure should adjust with Warmindo shops conditions and space. The researcher explains KLHK policy on EPR and explores the response of interviewees. Mr. Didi argues that we need to see it as part of business strategy. As producer, he assumes Indofood has calculated the whole cost from production, distribution, and waste management. With or without EPR, the producer has integrated all the cost items to the product price. To improve the sustainability of waste management after its consumption, increasing product price is one of the potential options. Customer currently does not know the reason behind the producer's decision to increase product price. When the product price is increased to manage waste packaging, as a customer of noodles, he will not mind if it is used as expected. The collected fund from the increase of product price should be used to incentivise all stakeholders along the waste collection for example the Warmindo, the intermediary, and recycler. To some extent, it can be used to support the government if the government is affected by consequences of the EPR regulation.

For material that cannot be recycled such as sachet, it might be difficult to substitute the material. In this case, Mr. Didi prefers to incentivise the stakeholder along the waste management. Even though the material of multilayer plastic packaging has been changed, it will not solve the problem of waste collection. Selection of material for plastic packaging is not the only reason that makes this plastic packaging difficult to manage. If the materials cannot be recycled, the fund can be used by the government to manage this waste just like in Singapore. The fund can be used to subsidize this process and is managed by the government. He concludes that awareness among the community is low regarding waste management. We cannot wait to manage the waste properly when all land has been occupied.

### **3. Warmindo SAFA**

Address : Jl. Gondang Raya, Bulusan  
Tembalang - Semarang

Date : 14 October 2020

Interviewee(s) : Hendri

This Warmindo is established and operates since 2019 however it is a relocation from the previous Warmindo at Jl. Tirta Husodo. Mr. Hendri opened Warmindo at Jl. Tirta Husodo in 2014. This Warmindo is participating in the Green Warmindo Program of Indofood since it was first launched in 2018. Prior to the Green Warmindo Program, Indofood had several programs such as providing transportation vehicles for home return and providing banners for the shop identity. In the program, he and his team are trained to recognise type of waste, waste values, sort, and collect the waste according to its type. Most inorganic waste from Warmindo business is valuable waste with various prices. So, this shop collects most of plastic waste except sachets, paper, and 'etiket' (multilayer plastics containing all plastic materials). This shop collects on average 5 kg of various plastics, 3 kg paper, 1-2 kg 'etiket' per week. The 'etiket' is associated with noodle plastic packaging of Indofood that is measured as part of the program indicator. One kg of 'etiket' normally consists of 500 pieces of noodle plastic packaging. By participating in the Green Warmindo program, the shop is now easier to dispose of the waste. A pickup service is provided every week to handle the waste without

any fees. Because the waste has been sorted according to its type, the waste has value. The waste is converted into money and saved in the program for withdrawal annually. The cleanliness and tidiness of the shop is improving because it is part of the indicator for evaluation of the program. The other indicators are ratio between waste collected and waste generation as well as number of waste varieties. Unfortunately, this program is only provided by Indofood. The other producers sometimes have programs related to marketing. For example, CAFFINO, a new instant coffee is promoting their product to return the plastic packaging. Every returned plastic packaging is paid for IDR 500.

The challenge in participating in the Green Warmindo program is the shop must sort the plastic packaging two times. The first sorting occurs in the kitchen but sometimes the waste is still mixed up because the workers are in a hurry. Consequently, the workers sort second times to make the collected waste can be sold. This process needs extra time otherwise it will be unmanageable. Some shops have small space so that they have limited space to collect the waste. The program provides special back up to collect the valuable waste however it is too small to accommodate the volume of waste.

In this program, Warmindo is at the forefront of a successful implementation. The obstacle that hampers effective implementation must be overcome. The producers can provide a special waste bin to keep the collected waste from the exposure of rain and sunlight. If the design of the waste bin is appropriate, it can be placed in front of the shop. Besides for functional purposes, it can be shown as the identity of the program.

Warmindo Safa suggests that the program provides a contract agreement between Indofood as producer and Warmindo as consumer participating in the program. The agreement will bind both parties to reach the target and indicator. Moreover, Warmindo also expects economic incentive to motivate achieving the target. A reasonable amount of economic incentive is expected that significantly reduces the operation cost of the shop, for example for renting the land.

Regarding economic incentive, the researcher explains about EPR policy that was recently launched by KLHK. Toward the economic incentive to return the plastic packaging, it will be not effective to attract individual customers to return if the

number is small. If the incentive is reasonable then it will attract individuals for example a new instant coffee product, CAFFINO, gives IDR 500 back per piece out of its product price IDR 1,400. But this product seems to just run a marketing strategy rather than a plastic packaging take-back program. Mr. Hendri also questions the source of incentive. He does not agree if the incentive comes from the customer deposit (DRS) because it will reduce financial liquidity only to save on the product price. In fact, he still looks for product discounts wherever it is offered. He disagrees with any types of incentive that rise from customer money because it will affect him as a big customer. He suggests that the producer covers the producer finances extended waste responsibility as it has a higher financial capacity. Otherwise, the producer replaces a low value plastic or demolishes it from their product. The INDOMARET (PT. Indo Marco) is a good example of how the producer can reduce plastic waste by not providing plastic bags.

After the multilayer plastic packaging is collected, the next stage according to the framework is to reuse the collected multilayer plastic waste. Some producers are promoting the reuse of their plastic packaging waste for decoration and craft products. Marimas is among the active producers to work with waste banks to promote reuse. To explore the reuse of multilayer plastic waste, this research interviews two waste banks that utilize multilayer plastic waste into plastic craft products.

Interviews at the reuse phase is described in the narrative summary below:

### **1. Arta Lestari Waste Bank**

Address : Jl. Meranti Timur Dalam No. 4, Kelurahan Pedalangan,  
Banyumanik, Semarang.

Interviewee(s) : Mrs. Arta

Date : 14 October 2020

Arta Lestari has been making craft to reuse plastic waste for more than one decade however the commercial product has been produced for less than ten years. Not all types of plastic can be used as materials for craft product. Homogeneous plastics both in colour and type are preferable because they are easier and flexible to any designs. Plastic bag and straw are among the favourite materials for making



craft products. They can be used to produce artificial flowers and plants, souvenirs, and decoration for Christmas and wedding celebrations. In contrary, multilayer plastic waste such as sachet (with metal layer) and printed plastic waste are among the difficult materials to use for craft product.



Figure 6. The Artificial Flowers Reusing Plastic Packaging Waste

Arta Lestari waste bank is producing crafts without any association with EPR initiatives. They get the skill to design and make plastic crafts through learning by doing. There is no specific training reusing plastic has been participated by the waste bank members. The initiative to use plastic waste as craft products is promoted by Mrs. Arta. She learnt and practiced on how to make plastic craft since she was young. As her skill improved, the quality of the products increased. She transfers her skill to other waste bank members through training and coaching within their group.

In general, when we can make plastic craft in a good quality, the price can be expensive. The economic value of plastic craft can be several times higher than if it is sold as recycled material. However, it needs high skill to produce high quality products. It needs creative and passionate people to produce plastic craft products that can satisfy the market. Mrs. Arta has taught her colleagues in the waste bank on how to make plastic craft but none of them can produce it independently. Therefore, the plastic craft production still relies on her while the other colleagues are supporting her in cutting and gluing. So, the skill is not easily transferred to



other people. Second to that, most multilayer plastic waste is challenging to be reused as plastic crafts. To make plastic craft from plastic packaging, they need to hide the product brands that make the craft production not flexible. Multilayer plastic with metal is also not attractive as craft products. The market is not responding positively to the product from plastic packaging with metal layers. The performance of reuse (for craft products) is only 3 out of 10 scale.

The researcher explains EPR to the interviewee and raises a question about the chance of reuse activity to process the collected plastic waste. The capacity of plastic craft production to absorb multilayer plastic waste is low. Mrs. Arta does not agree when the product price is elevated to cover treatment cost of the product after its end-of-life. Although product price increases are used to incentivize reuse actors, their effectiveness is less promising. She believes that it must be the responsibility of the producer solely because the decision to select material and design of product packaging is made by the producer. So, reuse activity is not a primary mechanism to treat multilayer plastic waste. However, she expects that the city government will give rewards to motivate reuse actors.

## **2. APL Jomblang**

Interviewee : Mrs. Ismi Suryadi

Address : Jl. Kinibalu Barat II, Jomblang  
Candisari – Semarang

Date : 14 October 2020

Mrs. Suryadi is a well-known waste reuse trainer in Semarang. She learnt about a waste decorative product and craft making from BINTARI Foundation in 2002-2003. She established APL, a women organization, to manage and maintain the neighborhood. The APL collects and reuses plastic packaging for making functional products. It focusses on functional products such as wallet, pencil case, book covers, laptop cases, laptop bags and others, rather than decorative products that have a smaller market. A wider range of plastic including multilayer plastic packaging can be used to make valuable products.

Due to its creativity, Marimas set up a cooperation with APL to promote waste reuse activities in Semarang and beyond. Mrs. Suryadi was assigned as a trainer, teaching women groups in making products from Marimas plastic packaging. Marimas product packaging is mainly a multilayer plastic sachet that consists of plastic and aluminum layers. Besides, the APL got orders from Marimas to produce plastic craft. In one transaction, Marimas can order between 1,000 to 2,000 units of product. The APL organises the member to fulfil the contract according to the agreed schedule. Marimas set up a quality control mechanism so that only the products that pass the QC are accepted.

Due to the high volume of order, the APL is unable to supply the raw material by its own plastic waste collection. Marimas supplies the raw materials while the APL focuses on manufacturing of the product. Marimas initiates a take-back of its plastic packaging waste from the retailers i.e. beverage stalls and shops. A plastic packaging returning program is established where beverage stalls and shops that return plastic packaging get rewards. Marimas provides several types of tableware which are associated with the number of plastic packaging being returned. The collected plastic packaging is dropped into the APL for washing, cleaning, and manufacturing. This EPR initiative has been actively promoted until the end of 2018.

In 2019, Marimas launched a new initiative called Eco-brick, to collect and store plastic packaging waste in PET bottles. The APL members are among the participants of training of Trainer on how to make an Eco-brick. This initiative however is more addressing to schools rather than community. Therefore, the role of APL is not as intensive as the previous initiative. According to the APL, the programs initiated by Marimas run very well because the Marimas owner is highly committed. The success of the EPR is dependent on producer commitment. the APL believes that the program gives advantage to producers in term of selling volume as Mrs. Suryadi heard.

The researcher explains the Ministry of Environment and Forestry policy on producer responsibility. Mrs. Suryadi has no specific response regarding the policy because Marimas as producer has implemented a responsible plastic packaging waste as required by the policy.

The last cycle of the framework is recycling of the multilayer plastic packaging. This stage is essential to determine how the multilayer plastic packaging is categorized as a circular economy product. To explore the recycling opportunity of the multilayer plastic packaging, the researcher interviews recycling companies.

The interview results are summarised below:

### **1. PT. PUTRA CAHAYA MAKMUR PLASINDO**

Interviewee : Bufan Tjan (Director)

Address : Pergudangan Tritan Taman B9-11, Jemundo, Sidoharjo

Date : 20 October 2020

PT. Putra Cahaya Makmur Plasindo (PCMP) is able to recycle a multilayer plastic packaging into a new product. PCMD moults multilayer plastic waste to produce a gutter carpet. This ability is not owned by many other companies because it needs more investment while the number of raw material supply is limited. The multilayer plastic packaging waste from companies, normally from production failure, is preferable because it is clean and supplied in a high volume. It can easily feed into the production line directly, without any additional treatment. The multilayer plastic packaging waste from the aggregator and including from waste banks are not preferable because normally dirty and the continuous supply cannot be ensured. PCMP needs an additional washing process and drying before the waste is injected to the moulting machine. The washing and drying processes require intensive cost for water and energy. It becomes a major barrier to receive such materials from waste banks even though PCMP has received these materials many times.

Another barrier is that not every type of multilayer plastic packaging is able to be recycled. PCMP is only able to recycle multilayer plastic packaging from plastic with plastic while plastic that combined with non-plastic material cannot be recycled yet.

The benefit of investing in a multilayer plastic packaging waste processing is competition between companies. The ability of PCMP to process a multilayer

plastic packaging becomes a competitive advantage compared to other companies that mostly focus on PET, PE, PP, and HDPE. The multilayer plastic packaging waste processing is only a minor business of PCMP.

The regulation on producer responsibility toward their waste gives implication the producer responds. Several producers visit the PCMP factory to assess the chance to process their multilayer plastic packaging waste as part of their extended responsibility. However, the agreement cannot be established. PCMP requests a subsidy IDR 2,500 per kg of waste input. This subsidy will be used to cover additional treatments such as washing and drying as well as to pay back the investment. PCMP argues that if the processing is done without subsidy, the producers will get many advantages, but the recycling stays the same. This business-to-business negotiation has not reached an agreement yet.

If the mechanism to finance this subsidy can be established, whoever pays the subsidy, the recycler deserves to receive it since multilayer plastic packaging waste processing is not an attractive business. Only a few producers can process so that the distribution of the facility is uneven across the country. By this distribution, the transportation cost from waste collection to waste treatment will be expensive. The subsidy can play a good role in attracting the recycling industry to invest and to make the facility available in every region.

## **2. PT. REBRICKS INDONESIA**

Interviewee : Tan Novita (CEO)

Address : Jl. Ciputat raya no.79, Pondok Pinang, Jakarta Selatan

Date : 3 November 2020

Rebricks Indonesia (later mentioned as Rebricks only) is a start-up company established to respond to the sachet packaging waste problem that is typically made up of laminated plastic and aluminum film. According to Rebricks, the current efforts to reuse and upscale sachet packaging waste processing is not effective. They turn it into fashion products such as bags, wallets, and pouches, but one fashion product usually uses less than 30 sachets while its lifecycle is short. The sachet packaging waste is also difficult to recycle because it needs a chemical



process to separate the plastic and aluminum film. In plastic recycling industries, it is considered as residue of plastic waste.

Due to the challenge of sachet packaging waste processing, the recycling actors do not collect it. On the contrary to other plastic waste such as plastic bottles, PET bottles, HDPE, and LDPE plastics which have an economic value, there is no economic incentive for collecting sachet packaging waste. It is left unmanaged. Hence, sachet packaging waste usually burns, disposed to landfill, or worse, through empty land, the river and ends up in the ocean.

Rebricks vision is creating recycled building materials from waste by transforming sachet packaging waste. To provide eco-friendly building materials that are durable, reliable, and safe, Rebricks mixes conventional materials (cement and sand) and shredded sachet packaging waste with a certain proportion to produce paving blocks. In the beginning of its trial, the sand and chopped sachet packaging waste were mixed and heated jointly but it produced dangerous smokes. To avoid further pollution, sachet packaging waste is cut smaller through shredding. The mix materials are moulded according to the intended shapes without any burning. The paving blocks are designed and sealed to prevent microplastic leakage. The final product is like the original paving block as shown by Tan Novita in the picture below.



Figure 7. Rebricks Initiators (Tan Novita & Ovy Sabrina) in the Rebricks workshop in Southern Jakarta

*Source: <https://mediaindonesia.com/humaniora/323066/cara-lain-mengolah-plastik>*

Rebricks claims that its products are durable for more than 20 years and still be reused, recycled, and remanufactured. The approach (using sachet packaging waste for building material) can be upscale into a mass production. One paving block machine can produce 100 m<sup>2</sup>/day and recycle 88,000 units of sachet packaging waste. Therefore, this approach is more effective to reduce waste and prevent the waste to stay longer than the current approach.

The other benefit to this approach is its products are applicable for normal use. The feature of the product, a paving block with a shredded sachet, is like the original paving block. So, it can easily replace or substitute the original paving block. It also has similar strength to the original paving block. The formula of mixing materials has been calculated according to the national standard for building materials. The material pressure test has been established to measure the product strength and passed 250 kg/m<sup>2</sup>. This result showed that Rebricks paving block is feasible to apply for carport.

Despite its benefits, this approach also faces some challenges. As a new product, the market acceptance is still low. Even though the features of Rebricks and original paving blocks are similar, as a responsible and transparent company, Rebrick gives information about its product material and specification to the buyers. Most buyers prefer to use the original paving block. Only buyers with environmental commitment will select Rebricks products. The second challenge is material supply. Currently, material supply is sufficient to fulfil the production capacity. The news coverages about Rebricks initiative have triggered the community to voluntarily collect and send sachet packaging waste to the workshop. However, some waste aggregators also start to offer continued supply with a certain price. Unfortunately, the economic model for using sachet packaging waste for paving block materials is not well-developed yet. The business model is still part of the challenge.

Rebricks expects that by long term education, the market acceptance to the product will be developed. The subsidy from producers is also expected to cover additional cost for processing the sachet packaging waste and ensure material



supplies when it comes to mass production. Several producers have contacted Rebricks for collaboration; however only Indofood has made a short agreement by sending materials and buying the product.

### **3. Landscape Indonesia (PT Bentang Alam Indonesia)**

Interviewee : Agus P. Sari

Address : Generali Tower 16th floor, Jl. H.R. Rasuna Said Jakarta 12940

Date : 18 November 2020

Landscape Indonesia is incorporated as PT Bentang Alam Indonesia, a company to ensure that landscape management in Indonesia is carried out sustainably while sufficiently and sustainably financed. It uses a landscape approach that spatially and participatory strives to balance seemingly competing goals of protection and production. The spatial aspect is clearly defined as the scope-based indicators to assess the strategic of the project/program ecologically, economically, and socially.

Landscape Indonesia identifies that financing factors often challenge the sustainability of landscape management therefore it requires innovative financing structures that fit with unique cases of different landscapes. In providing financing alternatives, Landscape Indonesia combines public and private sources, short- and long-term tenures, low- and high-risks, grant and commercial financing. This structure is expected to lead to a successful capitalization of ecosystem services. For that objective, Landscape Indonesia designs the Landscape Incubation Facility for the Environment (LIFE) Program to assist and facilitate environmental and social entrepreneurs. The incubation program will be equipped with a Fund to provide financial resources for environmental and social business.

The plastic marine debris has been identified as a global problem where Indonesia contributes significantly. Multilayer plastic packaging waste, especially sachets that have been identified as the most challenging waste. Landscape Indonesia assesses some initiatives and technologies to manage sachet packaging waste and test the use of pyrolysis to convert plastic into diesel-like fuel. Pyrolysis is a way to burn materials without the presence of oxygen. The small-scale pyrolysis equipment (about 5 kg – 100 kg processing capacity) has been used to

turn every kilogram (kg) of plastic waste into one litre of fuels, mainly diesel-like fuel.

Landscape Indonesia is working with local partner, Rumah Hijau, in Pramuka Island in the Islands of Seribu DKI Jakarta. Pramuka Island is chosen as the location for the pilot project for the following reasons:

- It has strong waste bank movement and has managed to collect 1 ton of waste per day, including 40 percent inorganic waste, 60 percent of which are plastic waste of different kinds, while only 1 ton of garbage can be sold per month.
- Seribu Islands has been selected as the “10 new Bali” tourism acceleration program that requires waste management improvement.
- It has limited space for waste processing or dumping facilities; otherwise, people will dispose directly in the ocean.
- Plastic wastes have affected the two largest economic sectors in the islands: marine tourism and fishery.

The application of plastic conversion into diesel-like fuels resulted in a good quality of diesel according to the laboratory test. It has high cetane number, a value indicating quality of diesel oil, that equal to high quality diesel of PERTAMINA. The test also shows a good conversion ratio where one kg plastic waste can produce one litre fuel. The production cost per litre is competitive to the market price of diesel in the island. The fuel price in the Seribu Islands is normally higher than the price in the main island (Java). Therefore, local fishermen use the product for daily fishing activities.



Figure 8. Installation of a pyrolysis machine at the Rumah Hijau in Pramuka Island, Jakarta.

Source: <https://www.arabnews.com/node/1761246/world>

As a new product however, it does not have a product and distribution permit yet. So, it is still considered an illegal product. Landscape Indonesia is managing this issue with the relevant authorities. Second to that, the safety aspect for long-term use is still under observation since it is still in the piloting phase. To avoid a dispute with fishermen who use the product, Landscape Indonesia requested a statement letter that the user will not complain about any effect to the boat engine because of the use of the diesel-like product. For this pilot project, Landscape Indonesia does not calculate the investment cost. The pyrolysis equipment is granted to Rumah Hijau as the Landscape Indonesia contribution. So, investment cost is not internalized yet as part of production cost. Apart from legal and technical aspects, Landscape Indonesia still plays a significant role in subsidizing the investment cost for pyrolysis equipment.

Being optimistic with the pilot result, Landscape Indonesia is promoting this pilot project to any entity working to combat plastic marine debris. The plan will include (1) scaling up the pyrolysis production workshop, and (2) scaling up plan for the utilization of the pyrolysis devices in partnership with local partners across Indonesia. Some requirements are needed to make those plans applicable. Licensing

process for the diesel-like products (coined as pyro-diesel) need to be sought to allow for it to be widely used as an alternative to diesel. Without proper licensing, both producers and consumers will be in uncertain and unprotected situations. The plastic conversion and the utilization of its product is at risk. Secondly, a long-term trial and evaluation are needed to assess the effect of diesel-like consumption to the engine. The trial and evaluation should be applied in various types of engines to make a wider range of users. In terms of financing, the business model of plastic conversion needs to be settled, profitable to all product chains and actors. If subsidy is needed, it should be internalized in the relevant parties such as companies or producers.

#### **D. Results of Direct Observation**

The observation is conducted to check and verify several information gained during document and archive review as well as interview. The researcher observed noodle stalls (Warmindo) and retail shops to see the variety of products that use multilayer plastic, measure the size, and verify the materials. This observation will support the argument that size, and weight of plastic packaging affects the collection effectiveness. The observation shows that there are many variants of products from many producers within one stall and or retail shop. Warmindo is associated with Indofood, it also sells instant beverages, snacks, bottled beverages, and even personal care products such as shampoo, and detergent from various producers. However, Warmindo only provides Indofood noodle products. The retail shop provides more variants of products including food and beverage, consumer goods, and personal care.

The size, weight, and materials of a product using multilayer plastic packaging varies. The researcher finds various ranges of product packaging size from the dimension of 2.0 cm x 3.0 cm to 14.0 cm x 24.0 cm. Size, weight, and materials of products that use multilayer plastic packaging are shown in the Table below.

Table 5. Size, Weight, and Materials of Some Product Packaging

No	Name of Product	Content	Size	Weight	Material
1.	Single candy	Solid	2.0 cm x 3.0 cm	± 1 gram	Plastic + plastic
2.	Chili sauce	Liquid	3.6 cm x 8.0 cm	± 3 grams	Plastic + aluminium
3.	Tablet candy	Solid	7.0 cm x 11.0 cm	± 4 grams	Plastic + aluminium
4.	Coated peanuts, small	Solid	8.0 cm x 11.0 cm	± 4 grams	Plastic + aluminium
5.	Coated peanuts, big	Solid	10.0 cm x 11.0 cm	± 5 grams	Plastic + aluminium
6.	Sunflower seed snack	Solid	10.0 cm x 14.0 cm	± 6 grams	Plastic + aluminium
7.	Noodle general size	Solid	12.0 cm x 16.0 cm	± 2 grams	Plastic + plastic
8.	Noodle premium	Solid	12.0 cm x 18.0 cm	± 3 grams	Plastic + aluminium
9.	Noodle Jumbo size	Solid	15.0 cm x 19.0 cm	± 2 grams	Plastic + plastic
10.	Wheat biscuit	Solid	9.0 cm x 20.0 cm	± 5 grams	Plastic + aluminium
11.	Potato Chips	Chip	16.0 cm x 24.0 cm	± 8 grams	Plastic + aluminium
12.	Corn Chips	Chip	14.0 cm x 24 cm	± 7 grams	Plastic + aluminium
13.	Herb small sachet	Liquid	3.0 cm x 11.0 cm	± 2 grams	Plastic + aluminium
14.	Herb big sachet	Liquid	5.5 cm x 11.0 cm	± 4 grams	Plastic + aluminium
15.	Fruit flavoured drink	Powder	7.0 cm x 10.5 cm	± 4 grams	Plastic + aluminium
16.	Instant Coffee	Powder	7.0 cm x 10.5 cm	± 4 grams	Plastic + aluminium



17.	Instant white coffee	powder	8.0 cm x 11.0 cm	± 4 grams	Plastic + aluminium
18.	Sweet milk	Liquid	7.0 cm x 11.0 cm	± 4 grams	Plastic + aluminium
19.	Milk powder	Powder	9.0 cm x 12.5 cm	± 5 grams	Plastic + aluminium
20.	Body Wash, small	Liquid	6.0 cm x 8.0 cm	± 3 grams	Plastic + aluminium
21.	Body wash, medium	Liquid	12.0 cm x 20.0 cm	± 10 grams	Plastic + plastic
22.	Shampoo	Liquid	6.0 cm x 8.0 cm	± 3 grams	Plastic + aluminium
23.	Cooking ware soap	Liquid	12.0 cm x 17.0 cm	± 8 grams	Plastic + plastic
24.	Detergent, small	Powder	8.0 cm x 10.0 cm	± 5 grams	Plastic + aluminium
25.	Detergent, medium	Powder	14.0 cm x 24.0 cm	± 10 grams	Plastic + aluminium



In the waste bank, TPS 3R, and waste aggregator, multilayer plastic packaging waste is mostly not collected because it is difficult to sell. Some waste banks collecting multilayer plastic packaging waste are those involved in City Government programs in combating low value plastics. In 2020, the Semarang Environmental Agency gives subsidies through buying low value plastic IDR. 500 per kg.



Figure 9. The Mixed Plastic Waste Stored in the Waste Aggregator before Sorting Activities



Figure 10. The Mixed Plastic Waste Sorted according to Type and Color

