

# The Importance of Circular Economy for Indonesia from Business Perspective

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**Keywords:** Circular Economy, Waste Management, Plastic Waste in Indonesia, Business Role in Making Indonesia More Circular, Waste Reduction, Sustainable.

**Abstract:** A circular economy is an economic system where products and services are traded in closed loops or 'cycles'. A circular economy is characterized as an economy which is regenerative by design, with the aim to retain as much value as possible of products, parts, and materials. This means that the aim should be to create a system that allows for the long life, optimal reuse, refurbishment, remanufacturing and recycling of products and materials (Kraaijenhagen, Van Oppen & Bocken. 2016, Ellen MacArthur Foundation, 2016). Indonesia's economic and population growth has been accompanied by the depletion of natural resources and major environmental pollution. This study is conducted to highlight the importance of circular economy in Indonesia due to the high number of waste produced annually without proper management. Indonesia is the second waste producer (TheJakartaPost, 2015) and four of Indonesia's rivers are within the 20 most polluted rivers in the world (The Conversation, 2016). Projected by the Indonesian Misnistry of Environment and Forestry waste projection will increase by 5 million tons by 2025 and without action taken, global waste is projected to grow 70% by 2050 (World Bank, 2018). By implementing a circular economy, waste can be transformed into resources which, aside from reducing the human ecological footprint, it would be beneficial for business who knows how to utilize this concept.

## 1 INTRODUCTION

The purpose of doing this study is to help Indonesian to start realizing that the current consumption habits are creating a lot of waste that is difficult to decompose, recycle and re-new which will lead to depletion of resources. By implementing a circular economy, Indonesia might produce lesser waste, the country will be cleaner, people will be healthier, and the degradation of ecosystems can be minimized. According to news published by the European Parliament, the circular economy is very important because as the world's population is growing and demand crucial raw materials and energy increasing, our world is heading to scarcity. With applying circular economy, pressure on the environment could be reduced and it will also stimulate innovation and boost economic growth by creating jobs.

To understand the scale of the problem that the world is facing against plastic pollution, we ought to understand various elements of plastic production, distribution, and the waste management chain. In

September 2018, a study of plastic pollution is conducted by Hannah Ritchie and Max Roser to highlight data of world plastic waste (Hannah Ritchie and Max Roser (2019). Hannah and Max (2018) also listed down some importance of plastic management by reminding their reader that:

- Plastic pollution is having a negative impact on our oceans and wildlife health
- High-income countries tend to generate more plastic waste per person. (Higher consumption/purchase ability per person)
- How plastic waste is managed determines its risk of entering the ocean. High-income countries have very effective waste management systems; mismanaged waste, and ocean inputs are therefore low. Poor waste management across many middles- and low-income countries means they dominate the sources of global ocean plastic pollution.
- This makes the improvement of waste management systems across the world critical to addressing plastic pollution.

- Overall, approximately 80 percent of ocean plastics come from land-based sources, and 20 percent from the marine.

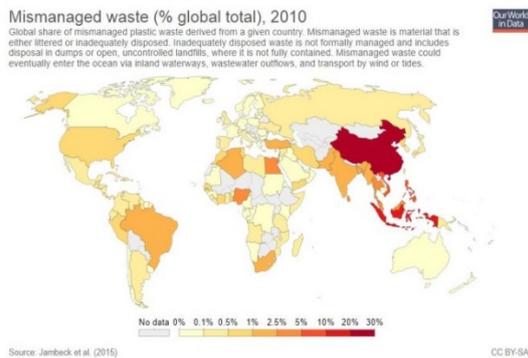


Figure 1: Mismanaged Waste (% global total), 2010. (Source: Jambeck et al., (2015)).

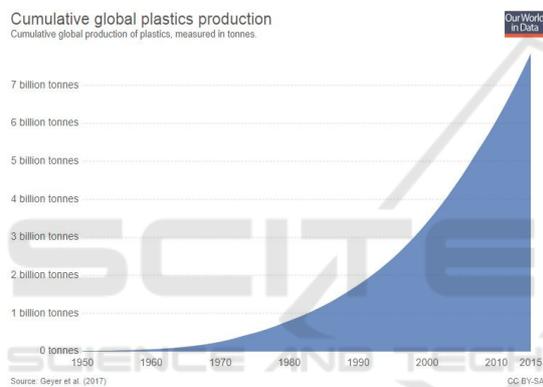


Figure 2: Cumulative Global Plastics Production. (Source: Geyer et al., (2017)).



Figure 3: Share of Plastic Waste that is Inadequately Managed, 2010. (Source: Jambeck et al., (2015)).

On figure 1. shows how crucial Indonesia have to start transitioning from linear to a circular economy, particularly in plastic waste, as Indonesia represent

20% of global total mismanaged plastic waste in the world.

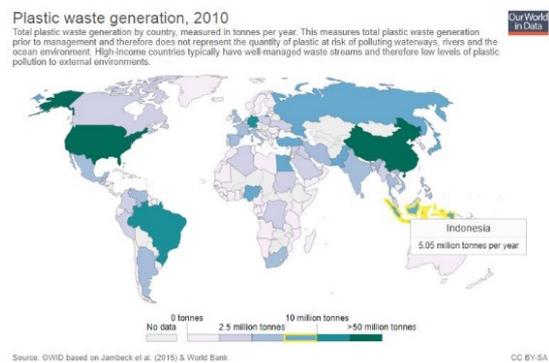


Figure 4: Plastic Waste Generation, 2010. (Source: OWID based on Jambeck et al., (2015) & World Bank).

By 2015, Our World in Data shows that the world has produced 7.8 billion tonnes of plastic ( $\geq 1$  tonne of plastic per person).

From Figure 3 and 4, calculated that Indonesia contributes 4.09 million tonnes in creating un-recycled plastic waste per year.

## 2 LITERATURE REVIEW

Linear Economy, the way our industrial economy has been carried out over the last 150 years. It is a one-way model of production and consumption in which goods are manufacture from raw materials, sold, used, and the incinerated or discarded as waste (Thibaut. W, 2018). The concept of a circular economy has been discussed since the 1970s. However, the system just got more attention lately, moreover from global companies and policymakers. In the World Economic Forum 2012 in Davos, the Ellen MacArthur Foundation (EMF) and McKinsey Company published a report which evaluates the potential benefits of the transition to a circular economy (CE): it could create an opportunity of US\$630 billion a year for only a subset of the EU manufacturing sectors (Ellen MacArthur Foundation (2012, p. 5)).

The European Commission has been emphasizing on the importance of the circular economy, and the Government of Netherlands has been progressing with this new system. *"The world population is growing, and this is affecting the environment. To ensure there are enough food, water, and prosperity in 2050, we need to switch from a linear to a circular economy. That's why the government has developed the Government-wide programme for a Circular*

*Economy. The aim is to ensure healthy and safe living and working conditions, and cause less harm to the environment.*" (Netherlands Government Website, 2019).

Such an economy is based on a few simple principles, as shown in Figure 6. First, at its core, a circular economy aims to design out waste. Waste does not exist: products are designed and optimized for a cycle of disassembly and reuse. These tight component and product cycles define the circular economy and set it apart from disposal and even recycling, where large amounts of embedded energy and labour are lost. Second, circularity introduces a strict differentiation between consumable and durable components of a product. Unlike today, consumables in the circular economy are largely made of biological ingredients or 'nutrients' that are at least non-toxic and possibly even beneficial, and can safely be returned to the biosphere, either directly or in a cascade of consecutive uses. Durables such as engines or computers, on the other hand, are made of technical nutrients unsuitable for the biosphere, such as metals and most plastics. These it is calculated from the start for reuse, and products subject to rapid technological advance, for an upgrade. Third, the energy required to fuel this cycle should be renewable by nature, again to decrease resource dependence and increase systems resilience (McDonough, W., Braungart, M., Cradle to Cradle: Remaking the Way We Make Things, New York: North Point Press, 2002).

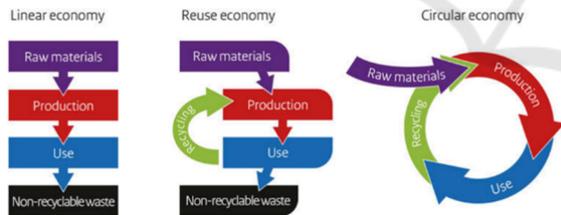


Figure 5: From Linear to Circular Economy Source: Netherlands Government Website, 2019 <https://www.government.nl/topics/circular-economy/from-a-linear-to-a-circular-economy>.

The two Towards the Circular Economy reports published by the Ellen MacArthur Foundation provide ample evidence that circularity has started to make inroads into the linear economy and has moved beyond proof of concept. A number of businesses are already thriving on it. Innovative products and contracts designed for the circular economy are already available in a variety of forms—from innovative designs of daily materials and products (e.g., biodegradable food packaging and easy-to-

disassemble office printers) to pay-per-use contracts (for tyres for instance). Demonstrably, these examples have in common that they have focused on optimizing total systems performance rather than that of a single component.

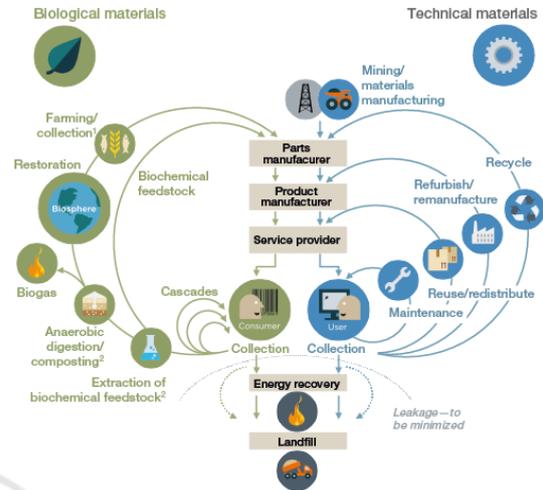
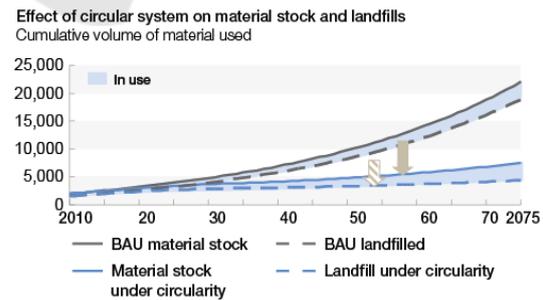
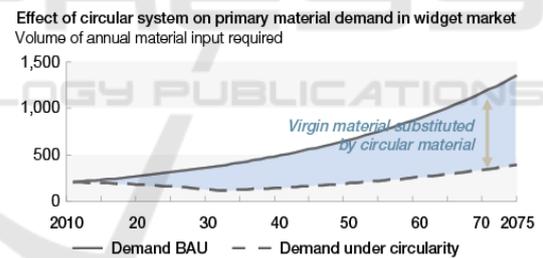


Figure 6: The Circular Economy - an industrial system that is restorative by design. (Source: World Economic Forum, 2019 by Ellen MacArthur Foundation circular economy team drawing from Braungart & McDonough and Cradle to Cradle (C2C)).



Source: Ellen MacArthur Foundation circular economy team

### 3 METHODOLOGY

Analysing secondary data based on Circular Economy literature review and the content of this desk review is based on information that collected

through a systematic review of the relevant document such as books, journals, scientific research, website, and opinion from the experts in the relevant area and other trusted information in the world. A desk review was an implementation model that has been taken based on data and statements from The Ministry of Environment and Forestry Indonesia, The European Economy: From a Linear to a Circular Economy Report, and other journals, websites, and scientific researches that related with the Circular Economic content. However, the limitation of a desk review approach is that researchers only can found and rely on data that is already available on the sources. The new concept of Circular Economy from linear to circular and it benefits needs to be describe more comprehend and clear for measuring the Circular Economy through specific indicators that make it successful in implementing. The indicators of the Circular Economy rely on six basic principles that should be known and observed (Circle Economy, 2015a) is the infinite nature of matter and material cycle, the use of renewable energy, supporting ecosystemic services and natural capital, supporting healthcare and human activity, supporting society and culture, the generation of value – both financial and of other types. But, this research is focused on waste plastic management that would be reduced through Circular Economy concept.

Thus, the World Bank has developed over 50 specific environment and sustainable development related indicators; Eurostat has developed 32 indicators to measure the efficiency of resources use, and UN environment has developed indicators for sustainables development. The main point of indicators which are the five common areas; resource productivity, environment related issues, economic opportunities, social aspects, waste management (Åkerman, 2016; p. 23).

### Resources Efficiency

#### Indicator Sub-classes:

- Energy consumption
- Consumption of resources Ecological efficiency
- Ecological footprint
- Consumption patterns
- Organic farming
- Land use

#### Indicators:

- Consumption of natural resources
- The consumption of timber
- Energy consumption
- The use of renewable energy

- The proportion of renewable energy by sources
- Domestic material consumption, calculated by material types
- The rate of the surfaces occupied by organic farms / total area used in agriculture
- Energy consumption calculated in terms of the type of transportation Investment in road infrastructure by types - Annual energy consumption / per capita
- The rate of energy consumption covered by renewable sources

### Environment and Components

#### Indicator Sub-classes:

- Climate change
- Biodiversity
- Eco systemic services

#### Indicators:

- Artificial land
- Energy consumption
- Natural capital
- The level of CO2 emissions
- The ratio of forests affected by deforestation
- The ratio of total area running the risk of soil erosion

### Economic Development

#### Indicator Sub-classes:

- Investment Competitiveness Profitability
- Returns Economic value
- Market diversity

#### Indicators:

- GDP/capita
- The rate of GDP growth
- The rate of inflation
- Net national income (% of GDP)
- Total expenditure on research development (% of GDP)
- Public expenditure on education (% of GDP)

### Population

#### Indicator Sub-classes:

- Access to the labour market
- Poverty
- Consumption behaviour
- The protection of human health
- Food safety
- Society and culture
- Education

**Indicators:**

- Sanitation services
- Indicators referring to human health The unemployment rate
- The poverty rate
- Healthy life expectancy by gender
- Expenditure on healthcare (% of GDP)
- The number and size of households
- Mean years of schooling

**Waste Management**

**Indicator Sub-classes:**

- Recycling
  - 3R
  - 7R

**Indicator:**

- The amount of waste collected/capita
  - The production of hazardous waste /economic activities
  - The population connected to the waste water treatment system
  - Solid waste derived from industrial and household consumption
  - Radioactive waste management
- Waste recycling and reuse

Source: Quantitative Approach to Circular Economy in the OECD Countries (2018), apud. Akerman (2016).

**3.1 Research Limitations**

The limitation of this study is for lack of business stakeholders to realize how to impact the plastic waste for the environment and the company it self. It might be happened for the hiding components or under reporting issues around these Circular Economy for Indonesia from Business Perspective. In the other hand, the more information about the companies program that has been implemented before is needed to fulfill the completeness of this study field about the plastic waste issues in Indonesia. The limitation of this study is a very short time and the less of the fact of implementation quantitative data that can get from the business stakeholders. So far, information that has collected from various literature are so complex and sometimes contradictory. The very large number indicators that used in the analysis carrying the readers unto a general waste reduction. However, such data can be used in analyzing the pollution due to the use of inefficient plastic waste reduction.

**4 DISCUSSION**

From all information that we have got, the conclusion of this study is based on regulation as written in act No. 18/2008 that the Indonesian government should do the targets in implementing of good waste management especially in plastic reduction. As the Presidential regulation number 97/2017 on national policy, household and company must have their strategy to manage their waste properly. The programs will be started from reducing waste by 3R (reduce-reuse-recycle) until 30% to 2025, while target a reduction plastic waste as much as 70% in 2025 Coordinating Ministry for Marine Affairs Republic of Indonesia, 2018). There would be five strategies in national action plans which are; behavioural change, reduced land-based leakage, reduce sea-based leakage, enhanced law enforcement and financial, also reseach and development in implementing integrated manner on plastic waste reduction at sea.

Based on the regulation No. 83 the year 2018 about garbage handling sea, there would be five startegies in national action plans which are;

**1. Behavioral Change**

Educate youth, campaign, increase awareness, awards, school curriculum, and train waste sorting.

**2. Reducing Leaks Through Land**

Solid waste management, recyckling industries are producing bio / degradable plastics, reuse of plastic waste (plastic asphalt roads) handling plastic waste from housing and rivers, and also payable plastic bags.

**3. Reducing Waste Leakage from Activities at Sea**

Reception facilities at ports, bilateral and regional collaborations, collecting plastic waste from coastal and marine areas, plastic waste management in tourism.

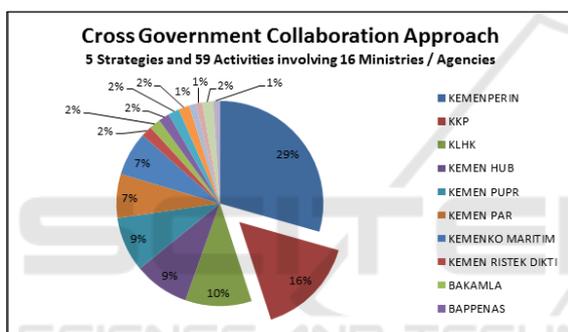
**4. Law Reinforcement and Funding**

Supervision and monitoring, financing commitments, public heathl, and ecological risk assesments due to microplastic, application of incentives, and disincentives.

**5. Research and Development**

Biodegradable plastic from cassava/seaweed/palm oil, impact on human health, innovation, and technology for the circular economy, and waste to energy solutions.

Target reduction of ocean waste 2018-2015 with a total estimate of plastic waste 1,692 million ton/year BPS and Inaplas (Kemenperin). Total of National waste is 65.8 million ton (Jakstranas LKHK 2017). Meanwhile, this target is also needing more support from the government as well as written ini policy transformation (Law No. 18/2008, Govt Reg No. 81/2012, and Presidential Decree No. 97/2017). Shifting the paradigm from the the upstream to the downstream (before the law, law implementation, until the advance implementation). The advance implementation refers to the Circular Economy which means, that would be less waste by design, make waste a new life as long as possible sustainable cities and communities, and also responsible consumption and production. As a solid waste potential, plastic has become the 2nd largest amount that possible to pollute the environment (MoEF Indonesia, 2016-2017).



| SOLID WASTE POTENTIAL AS RESOURCE MATERIAL |                     |            |                      |                                    |
|--|---------------------|------------|----------------------|------------------------------------|
| No.  | Composition         |            | Amount (tonnes)      | Usage                              |
|  | Type                | %          |                      |                                    |
| 1  | Compostable Organic | 57         | 37.480.198,27        | Compost, biogas, heat, electricity |
| 2  | Plastic             | 16         | 10.520.757,41        | Raw material, heat, electricity    |
| 3  | Paper               | 10         | 6.575.473,38         | Raw material                       |
| 4  | Metal               | 4          | 2.630.189,35         | Raw material                       |
| 5  | Rubber              | 2          | 1.315.094,68         | Refused Derived Fuel (RDF)         |
| 6  | Textile             | 3          | 1.972.642,01         | Raw material                       |
| 7  | Glass               | 2          | 1.315.094,68         | Raw material                       |
| 8  | Others              | 6          | 3.945.284,03         | Others                             |
| <b>TOTAL</b>                               |                     | <b>100</b> | <b>65.754.733,81</b> |                                    |

On the mainland, Circular Economy concept on solid waste management (Ministerial Decree No.13/2012). The integrated solid waste management program is managed by the source to the final treatment (TPA) with promoting the 3R (reduce-reuse-recycle) and the Circular Economy may use the concepts of “Waste Bank Mechanism”. The works of waste bank program is a kind of solid waste facility that managed by community (informal sector) to collect re-cycle solid waste by educating people to do

segregation the waste from the source and bring it’s waste to the waste bank, including the separation of organic trash, plastic, and organic. The scheme would be the easiest way to succeed in the program and becoming the customs conducted routine and compulsory by the community around. After that, the community will get the benefit such as the garbage that has been separated and grouped by type, especially plastic waste that can then be used as a livelihood for the local community. Besides that, the results of the exchange of waste in the community banks of this waste will then give some money to those who have passed it instead of the trash.

The Implementation of 3R Program of Solid Waste Management through the Waste Bank to Promote Resource Efficiency and Circular Economy



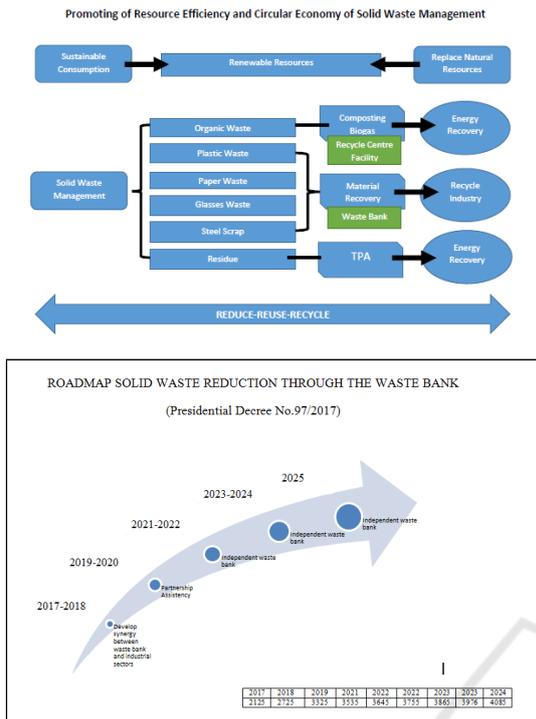
Jumlah Bank Sampah 2017: 5.244

- Total Waste Bank is about 5,244 spreading in 34 provinces and 219 cities in Indonesia
- Waste Bank create social engineering of sorting process to implement 3R program in the community
- Waste reduction from the sources
- Need more time and excellent methode to make this program massive in Indonesia

The impact of the implementation of 3R program solid waste management through the waste bank to promote resource efficiency and Circular Economy. In 2017, the total waste bank was about 5.244 spreading in 34 provinces and 219 cities in Indonesia. But, need more time and an excellent method to make this program massive in Indonesia. There are several benefits from the Circular Economy of the waste bank;

1. Increase solid waste treated in the source (ton/year)
2. Create job opportunity for community
3. Contribute to the national waste reduction
4. More Circular Economy (Income)

| National Target of Solid Waste Management<br>(Presidential Decree No. 97/2017) |            |            |            |            |            |            |            |             |            |            |            |
|--|------------|------------|------------|------------|------------|------------|------------|-------------|------------|------------|------------|
| National Target on Solid Waste Management                                      |            |            |            |            |            |            |            |             |            |            |            |
| Indicator  | 2015       | 2016       | 2017       | 2018       | 2019       | 2020       | 2021       | 2022        | 2023       | 2024       | 2025       |
| Solid Waste Estimation (Million Ton)   | 64,4       | 65,2       | 65,8       | 66,5       | 67,1       | 67,8       | 68,5       | 69,2        | 69,9       | 70,6       | 71,3       |
| Solid Waste Reduction (Million Ton)  | 10% (6,44) | 12% (7,82) | 15% (9,89) | 18% (12)   | 20% (13,4) | 22% (14)   | 24% (16,4) | 26% (17,99) | 27% (18,9) | 28% (19,7) | 30% (20,9) |
| Solid Waste Handling (Million Ton)   | 70% (4,5)  | 71% (4,6)  | 72% (47,3) | 73% (48,5) | 75% (50,3) | 75% (50,8) | 74% (50,7) | 73% (50,52) | 72% (50,3) | 71% (50,1) | 70% (49,9) |



From the perceptions of companies who have implemented the circular economy shows the commitment of the companies that have supported this movement and want to reduce the use of plastic waste to the impact of the use of plastic waste. As an example of the circular motion of the real economy, Unilever argues that plastic packaging plays a critical role in making our products appealing, safe, and enjoyable for our consumers *“So we’ve committed to ensuring that all of our plastic packaging is fully reusable, recyclable or compostable by 2025.”*

Nestle aiming to make its packaging recyclable or re-usable by 2025, *“Nestle believes that there is an urgent need to minimize the impact of packaging on the environment.”*

Danone, -AQUA plastic pladge, as a pioneer, an iconic brand has the opportunity to drive change at scale. *“Against a backdrop of rapid advancement in technology and increasing consumer concern about plastic waste, now is the time for AQUA to use its voice and act.”*

#### 4.1 Commercial Opportunities Today

In developing countries, more circular opportunities are lost at the manufacturing stage. In developed countries, losses are more heavily concentrated at the consumer level (Arthur M, 2013). Especially in packaging that would be more time for circulation and end of life materials can be cycled back through

one of two forms: either recycling the materials or returning nutrients to the soil via biodegradable packaging.

Recycling – solution when it is able to reuse and renew the plastic packaging from the trash and with the environmental friendly compositions. Arthur M, 2013 also said that this case shows a profit of nearly USD per tonne of plastic collected fro recycling. In parallel, more thoughtful product design and material choices should also significantly improve recovery and regeneration solutions.

Biodegradable packaging - more choice that correctly and become the alternative solution when using packaging return of bio-based materials such as seaweed or cassava. The lack of this packaging materials are currently more expensive than traditional packaging but, right now that problems are being developing and could allow the profitable evolution of biodegradable packaging. As Steve Sharp, executive director of marketing at Marks & Spencer, says: *“Not many years ago people would have been incredulous at the idea of routinely recycling bottles and plastic, yet this is now commonplace behavior. We want to try to achieve that same shift of behavior with our Shwopping campaign and make recycling clothes a habit”.*

#### 4.2 Accounting for the Business and Economic Benefits

Based on research for the fast-moving consumer goods could be much ad USD 700 billion per annum in material savings or a recurring 1.1 per cent of 2010 GD, all net of materials used in the reverse-cycle processes. Also, those materials savings would represent about 20 per cent of the materials input costs incurred by the consumer goods industry. In addition, by 2030 the prize could be much more than 700 billion and we expect to see circular business models accounting for a large part of the global bio-value chains.so, it is not distant works, investors, managers, and regulators will be talking about how companies get going and start learning how to hybridise their business models for markets that will be worth well over USD 25 trillion.

Refers to a potential consumption time bomb, there will be 1.1 billions more people, shift to packaged products, 1.8 billion more middle class consumers, and much greater waste at the end of life. Food (caloric consumption) will increase 24%, food spending will increase 57%, packaging will increase 47%, and end of life materials will increase 41% (Macarthur, E. (2013).

## 5 RESULTS

The finding of this study is that Indonesia still produces way more plastics than the capacity to manage plastic waste. It is true that the government has become more aware of this matter. Thus the nudge for action is still very low. The data that supports this finding is mentioned in the introduction of the study. Indonesia produces approximately 5.05 million tonnes of plastic waste, which 81% of them are inadequately managed (Jambeck et al. (2015) & World Bank). Government policy shows that law No.18/2008 been a long time make laws that govern about plastic waste, but there is no effort that looks good from the support of the Government in providing support for the company nor the community to attempt to separate the plastic waste and avoid their use.

Companies such as Danone, Nestle, and others have been doing their action in conducting prevention and solution to cope with a large number of plastic waste in Indonesia but their promotion is still very minimal, and there is no notice that opens in the media, as well as people, make the image as if they did not contribute. It still needs publications and more awareness from society. Through these events we can see the concern of society increased based on the Whale who died because they ate the plastic that seems right to prey they can eat like a jellyfish because of the physical form and colour resemble the shape and It turns out that after stranded inland content body filled with plastic waste with a number of 5.9 kilograms.

As a first step, we can do is being more aware and plan to have started at the individual level, base on article (wwf, 2018):

- Recycle everthing you can.
- Use your own cutlery, food containers, and KeepCups when getting a takeaway, rather than using disposable alternatives.
- Participate in beach or community cleans-ups.
- Tell the waiter to hold the straw when purchasing drinks.

## 6 CONCLUSIONS

Throughout the study, we have seen progress on how Indonesia wants to make a more sustainable way of consumption. The circular economy has become a focus for the government, although to create this system, not only the government that needs to play a role. The citizen/society, education institution, and

businesses have also taken their roles to make this system works better and make it be more effective.

We believe there are still things that can be improved in order to create sustainable Indonesia.

- a. Product Design from nature that has good monetary value and meet environmental friendly standard.
- b. More awareness and education on the impact of circular economy (ex: what will happen if the population keep increasing, resources keep depleting and no action taken)
- c. Government policy to encourage businesses to make the sustainable product more favorable (ex: less tax for easier product recycle process & subsidize project for recycling system or development or more circular products)
- d. Government to make standard criteria for goods production along with having a certification institution for environmentally friendly goods/products.
- e. Renew the system of waste collection to create more effective recycling process especially household, office and restaurant waste.

## REFERENCES

- Accenture. (2015). *CEO Guide to The Circular Economy*. wbcsl.
- Bank, W. (2018). *Strengthening Competitiveness*. Indonesia: The World Bank.
- Macarthur, E. (2013). *Towards the Circular Economy 1st Edition*. United Kingdom: Ellen Macarthur Foundation.
- Macarthur, E. (2013). *Towards the Circular Economy 2nd Edition*. United Kingdom: The Ellen Macarthur Foundation.
- Macarthur, E. (2013). *Towards the Circular Economy 3rd Edition*. United Kingdom: Ellen Macarthur Foundation.
- Aqua, D. (2018). Accelerate Collection and Recycling thru #BijakBerplastik movement. *EU-Indonesia Business Dialogue*. Jakarta: PRAISE.
- D. B. (2018). Circular Economy Opportunities in Indonesia. *Circular Economy: Maximizing Business Through Sustainable Practice*. Jakarta: Coordinating Ministry for Maritime Affairs Republic of Indonesia.
- Dhewanthi, L. (2018). From Waste Reduction Toward Cicular Economy Implementation in Indonesia. *Green Industry Conference*. Bangkok, Thailand: ESCAP.
- Ratnawati, R. V. (2018). The Implmentation of Circular Economy in Indonesia. *EU-Indonesia Business Dialogue*. Jakarta: Ministry of Environment anf Forestry Republic of Indonesia.
- Macarthur, E. (2013). *Towards the Circular Economy*. United Kingdom: The Ellen Macarthur Foundation.
- Parliament, E. (2016). *New Circular Economy Package*. Europe: European Union.

- C. C., L. A., M. B., & C. T. (2018). Quantitative Approach to Circular Economy in the OECD Countries. *Amfiteatru Economic*, 266-268.
- F. B. (2014). The European Economy: From a Linear to a Circular Economy. *Romanian Journal of European Affairs*, 1-3.
- Adebayo, Z. (2018, February 26). *borgenproject.org*. Retrieved January 12, 2019, from [borgenproject.org](https://borgenproject.org/tag/plastic-pollution-in-indonesia/): <https://borgenproject.org/tag/plastic-pollution-in-indonesia/>
- Alvionitasari, R. (2016, February 21). *en.tempo.co*. Retrieved December 21, 2018, from [en.tempo.co](https://en.tempo.co/read/746875/indonesia-produce-64-million-tons-of-waste-annually-ministry): <https://en.tempo.co/read/746875/indonesia-produce-64-million-tons-of-waste-annually-ministry>
- Andra, R. (2018, September 30). *medium.com*. Retrieved January 12, 2019, from [medium.com](https://medium.com/@reiga.andra/shifting-the-paradigm-indonesia-waste-management-from-linear-to-circular-economy-5454d321f0cb): <https://medium.com/@reiga.andra/shifting-the-paradigm-indonesia-waste-management-from-linear-to-circular-economy-5454d321f0cb>
- Antara. (2018, December 14). *en.tempo.co*. Retrieved December 21, 2018, from [en.tempo.co](https://en.tempo.co/read/923598/batam-administration-rejects-plan-to-import-plastic-waste/full&view=ok): <https://en.tempo.co/read/923598/batam-administration-rejects-plan-to-import-plastic-waste/full&view=ok>
- Ariffin, E. (2018, July 6). *theaseanpost.com*. Retrieved December 21, 2018, from [theaseanpost.com](https://theaseanpost.com/article/indonesias-plastic-waste-problem-0): <https://theaseanpost.com/article/indonesias-plastic-waste-problem-0>
- Bank, W. (2018, September 20). *worldbank.org*. Retrieved December 21, 2018, from [worldbank.org](https://www.worldbank.org/en/news/press-release/2018/09/20/global-waste-to-grow-by-70-percent-by-2050-unless-urgent-action-is-taken-world-bank-report): <https://www.worldbank.org/en/news/press-release/2018/09/20/global-waste-to-grow-by-70-percent-by-2050-unless-urgent-action-is-taken-world-bank-report>
- Bin, C. (2016). <http://chartsbin.com>. Retrieved January 13, 2019, from <http://chartsbin.com>: <http://chartsbin.com/view/2438>
- Brucker, D. (2017, November 14). *rubiconglobal.com*. Retrieved January 12, 2019, from [rubiconglobal.com](https://www.rubiconglobal.com/blog-statistics-trash-recycling/): <https://www.rubiconglobal.com/blog-statistics-trash-recycling/>
- Counts, T. W. (n.d.). *theworldcounts.com*. Retrieved December 12, 2019, from [theworldcounts.com](http://www.theworldcounts.com/counters/shocking_environmental_facts_and_statistics/world_waste_facts): [http://www.theworldcounts.com/counters/shocking\\_environmental\\_facts\\_and\\_statistics/world\\_waste\\_facts](http://www.theworldcounts.com/counters/shocking_environmental_facts_and_statistics/world_waste_facts)
- ESCAP, U. (n.d.). *unescap.org*. Retrieved January 5, 2019, from [unescap.org](https://www.unescap.org/sites/default/files/03.Li_Yang_2.pdf): [https://www.unescap.org/sites/default/files/03.Li\\_Yang\\_2.pdf](https://www.unescap.org/sites/default/files/03.Li_Yang_2.pdf)
- F. B. (2014). The European Economy: From a Linear to a Circular Economy. *Romanian Journal of European Affairs*, 1-3.
- Group, W. B. (2018, September 26). *worldbank.org*. Retrieved January 13, 2019, from [worldbank.org](https://www.worldbank.org/en/country/china/overview): <https://www.worldbank.org/en/country/china/overview>
- H. R., & M. R. (2018, September). *ourworldindata.org*. Retrieved January 12, 2019, from [ourworldindata.org](https://ourworldindata.org/plastic-pollution#ocean-plastic-sources-land-vs-marine): <https://ourworldindata.org/plastic-pollution#ocean-plastic-sources-land-vs-marine>
- Harvey, G. (2018, May 17). *politico.eu*. Retrieved December 21, 2018, from [politico.eu](https://www.politico.eu/article/ranking-how-eu-countries-do-with-the-circular-economy/): <https://www.politico.eu/article/ranking-how-eu-countries-do-with-the-circular-economy/>
- Iles, J. (2018, July 9). *medium.com*. Retrieved December 21, 2018, from [medium.com](https://medium.com/circulatenews/which-country-is-leading-the-circular-economy-shift-3670467db4bb): <https://medium.com/circulatenews/which-country-is-leading-the-circular-economy-shift-3670467db4bb>
- Jong, H. N. (2015, October 9). *thejakartapost.co*. Retrieved January 12, 2019, from [thejakartapost.co](https://www.thejakartapost.com/news/2015/10/09/indonesia-state-waste-emergency.html): <https://www.thejakartapost.com/news/2015/10/09/indonesia-state-waste-emergency.html>
- Krisyanidayati. (2018, December 16). *Tribunnews.com*. Retrieved December 21, 2018, from [Bangka.tribunnews.com](http://bangka.tribunnews.com/2018/12/16/kurangi-penggunaan-sampah-plastik-pemprov-wacanakan-buat-perda): <http://bangka.tribunnews.com/2018/12/16/kurangi-penggunaan-sampah-plastik-pemprov-wacanakan-buat-perda>
- MacArthur, E. (2018, December 21). The Circular Economy. United Kingdom, England.
- Network, D. F. (2018, November 30). *en.wikipedia.org*. Retrieved January 12, 2019, from [en.wikipedia.org](https://en.wikipedia.org/wiki/List_of_countries_by_ecological_footprint): [https://en.wikipedia.org/wiki/List\\_of\\_countries\\_by\\_ecological\\_footprint](https://en.wikipedia.org/wiki/List_of_countries_by_ecological_footprint)
- Network, G. F. (n.d.). *footprintnetwork.org*. Retrieved January 12, 2019, from [footprintnetwork.org](https://www.footprintnetwork.org/): <https://www.footprintnetwork.org/>
- Parliament, E. (2016). *New Circular Economy Package*. Europe: European Union.
- Pitoko, R. A. (2018, July 27). *ekonomi.kompas.com*. Retrieved December 21, 2018, from [kompas.com](https://ekonomi.kompas.com/read/2018/07/27/140000326/klhk-godok-dua-peraturan-menteri-untuk-atasi-sampah-plastik): <https://ekonomi.kompas.com/read/2018/07/27/140000326/klhk-godok-dua-peraturan-menteri-untuk-atasi-sampah-plastik>
- Purningsih, D. (2, January 19). *greeners.co*. Retrieved January 12, 2019, from [greeners.co](https://www.greeners.co/berita/penerapan-circular-economy-pengelolaan-sampah-belum-maksimal/): <https://www.greeners.co/berita/penerapan-circular-economy-pengelolaan-sampah-belum-maksimal/>
- R, J. J. (2015, February 13). *earthday.org*. Retrieved January 12, 2019, from [earthday.org](https://www.earthday.org/2018/04/06/top-20-countries-ranked-by-mass-of-mismanaged-plastic-waste/): <https://www.earthday.org/2018/04/06/top-20-countries-ranked-by-mass-of-mismanaged-plastic-waste/>
- Statistics, U. N. (2018, December 2018). *quandl.com*. Retrieved December 21, 2018, from [quandl.com](https://www.quandl.com/data/UENV/WASTE_IDN-Waste-Statistics-in-Indonesia): [https://www.quandl.com/data/UENV/WASTE\\_IDN-Waste-Statistics-in-Indonesia](https://www.quandl.com/data/UENV/WASTE_IDN-Waste-Statistics-in-Indonesia)
- Union, E. (2018, October 25). *ec.europa.eu*. Retrieved January 13, 2019, from [ec.europa.eu](https://ec.europa.eu/commission/commissioners/2014-2019/vella/blog/can-indonesia-be-regional-leader-circular-economy_en): [https://ec.europa.eu/commission/commissioners/2014-2019/vella/blog/can-indonesia-be-regional-leader-circular-economy\\_en](https://ec.europa.eu/commission/commissioners/2014-2019/vella/blog/can-indonesia-be-regional-leader-circular-economy_en)
- Union, E. (2018, October 26). *eeas.europa.eu*. Retrieved January 14, 2019, from [eeas.europa.eu](https://eeas.europa.eu/delegations/indonesia/52900/eu-indonesia-business-dialogue-2018-indonesia-stands-gain-adopting-circular-economy_en): [https://eeas.europa.eu/delegations/indonesia/52900/eu-indonesia-business-dialogue-2018-indonesia-stands-gain-adopting-circular-economy\\_en](https://eeas.europa.eu/delegations/indonesia/52900/eu-indonesia-business-dialogue-2018-indonesia-stands-gain-adopting-circular-economy_en)
- Wang, B. (2017, October 24). *nextbigfuture.com*. Retrieved January 13, 2019, from [nextbigfuture.com](https://www.nextbigfuture.com/2017/10/china-should-): <https://www.nextbigfuture.com/2017/10/china-should->

grow-to-world-bank-high-income-definition-around-2023.html

Wardhani, D. (2018, July 9). *thejakartapost.com*. Retrieved January 12, 2019, from *thejakartapost.com*: <https://www.thejakartapost.com/news/2018/07/09/ri-pushes-for-implementation-of-circular-economy.html>

Wright, T., & Waddell, D. S. (2017, September 5). *theconversation.com*. Retrieved December 21, 2018, from *theconversation.com*: <http://theconversation.com/how-can-indonesia-win-against-plastic-pollution-80966>

