



THE CIRCULAR ECONOMY ADVANTAGE

25TH SEPTEMBER 2017

Certified



Gone Adventurin' Pte Ltd
128 Prinsep Street, Singapore, 188655 GoneAdventurin.com



The views expressed in this paper/presentation are the views of the author and do not necessarily reflect the views or policies of the Asian Development Bank (ADB), or its Board of Governors, or the governments they represent. ADB does not guarantee the accuracy of the data included in this paper/presentation and accepts no responsibility for any consequence of their use. Terminology used may not necessarily be consistent with ADB official terms.



ABOUT GA

- **Advisory & Action firm** on a mission to enable businesses to unlock wealth from waste
- Founded in 2011, Gone Adventurin (GA) is **HQ'd in Singapore**. Executing research and deployments throughout **ASEAN and India**.
- We have developed successful pilots and strategies to recycle post-consumer plastic, tin and packaging waste for consumer goods companies such as P&G, Danone, Dole Foods, Amcor. Working with Singapore's National Environment Agency.
- Our projects bring together private and institutional investment to support local governments, businesses and nonprofit organizations to drive scalable waste management solutions

Certified

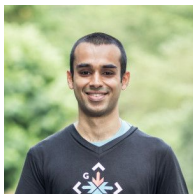


Gone Adventurin' Pte Ltd
128 Prinsep Street, Singapore, 188655 GoneAdventurin.com

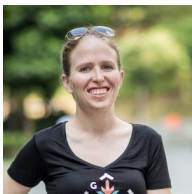




GA TEAM



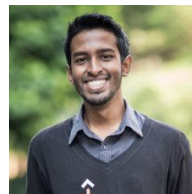
ASHWIN SUBRAMANIAM
CEO



LAURA ALLEN
COO



SUMANGALI KRISHNAN
HEAD OF RESEARCH



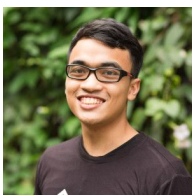
ABI BALASUBRAMANIAN
PROJECTS & COMMS HEAD



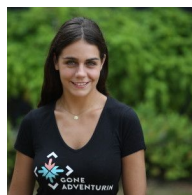
AMITA BAECKER
BUSINESS & PROJECT LEAD



EMILIE VAN TONNINGEN
PROJECT LEAD



AMIRUL ADLI
RESEARCH



PAULA MIQUELIS
PROJECT LEAD



CIRCULAR ECONOMY PRESSURES & OPPORTUNITY IN ASIA

INCLUDING:

EXTERNAL PRESSURES DRIVING CIRCULAR ECONOMY
THE CIRCULAR ECONOMY PRIORITY IN ASIA: WASTE
MOVING FROM LINEAR TO CIRCULAR

EXTERNAL PRESSURES DRIVING CIRCULAR ECONOMY

Overstepping Ourselves

As our Ecological Footprint continues to exceed Earth's biocapacity, we overdraw from our future.

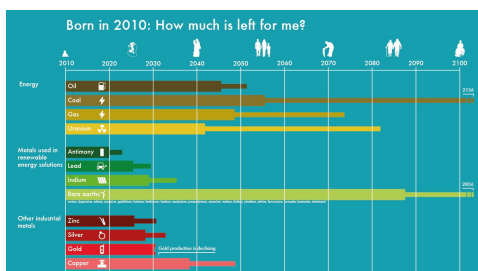


External pressures

- Rising costs for material, energy, land and water
- Resource constraints and price volatility
- Regulatory trends - growing pressure on business, legislation such as EPR

Internal opportunity

- Business and industrial innovation trends
- New sources of value creation
- Alignment with improved business priorities (i.e. eco-efficiency, risk management, carbon reduction, resilience)



Circular Economy strategies have been largely driven in Europe by resource efficiency needs and constraints.

Resource constraints & issues including:

- **Consumption of resources today is 1.6 times what the earth can produce.** By 2050 our global population is expected to reach 10 billion and we'll need 3 planet earths for our resources if we continue business as usual.
- **Many materials will run out in the next 25 - particularly metals for renewable energy solutions & electronics** such as lead, antimony, indium, zinc, silver and gold
- The exponential growth of population and resource use has come with its own challenges. And what multiplies these challenges is that our current models of consumption as a planet are overwhelmingly based on the linear principle. Materials are withdrawn from circulation or destroyed (even if thermal utilisation does at least produce energy) creating a lot of what we see today as waste.



THE CIRCULAR ECONOMY PRIORITY IN ASIA:

WASTE



The most pressing application of Circular Economy in Asia is with regards to waste management due to:

1. The overwhelming loss of value that could be captured
2. Overflowing landfills and limited space to create new landfills
3. High quantities of packaging, electronics, food waste etc leaking into the oceans and environment which is causing harm
4. Growing populations and consumption patterns resulting in 3-5x waste generation in Asia by 2025

1. Loss of value

The 1/3rd of food that is wasted globally is valued at a staggering \$1 trillion USD annually at a time of food shortages and anticipated supply shocks. The consumer goods industry is believed to be losing a total of \$1 trillion USD annually. One component of this is plastic packaging which is valued at 80-120 billion dollars annually. The disposal of electronics is resulting in the loss of increasingly scarce precious metals.

2. Overflowing Landfills and limited Space

Landfills throughout developing Asia are experiencing increasing instances of landslides and methane gas explosions resulting in loss of human life and property. Examples of landfills being shut down due to lack of space and environmental hazards abound in Asia. Increasing urbanisation and population pressures is preventing the opening of new landfills, thus the waste has nowhere to go.

3. Leakage of waste into the oceans and environment impact

8 million tonnes of plastic leaks into the oceans every year - this is equivalent to 1 garbage truck full of plastic every minute being dumped into the oceans. Over 80% of this plastic

comes from Asia. The plastic doesn't disappear - instead it breaks down into small pieces of plastic which are harder to retrieve and ingested by marine life. This plastic is increasingly entering our food chain - through seafood and salt for example.

Rivers, such as the Pasig river in Manila, are being deemed biologically dead all throughout Asia.

If global food waste was a country then it would be the 3rd largest emitter of greenhouse gas emissions behind US and China.

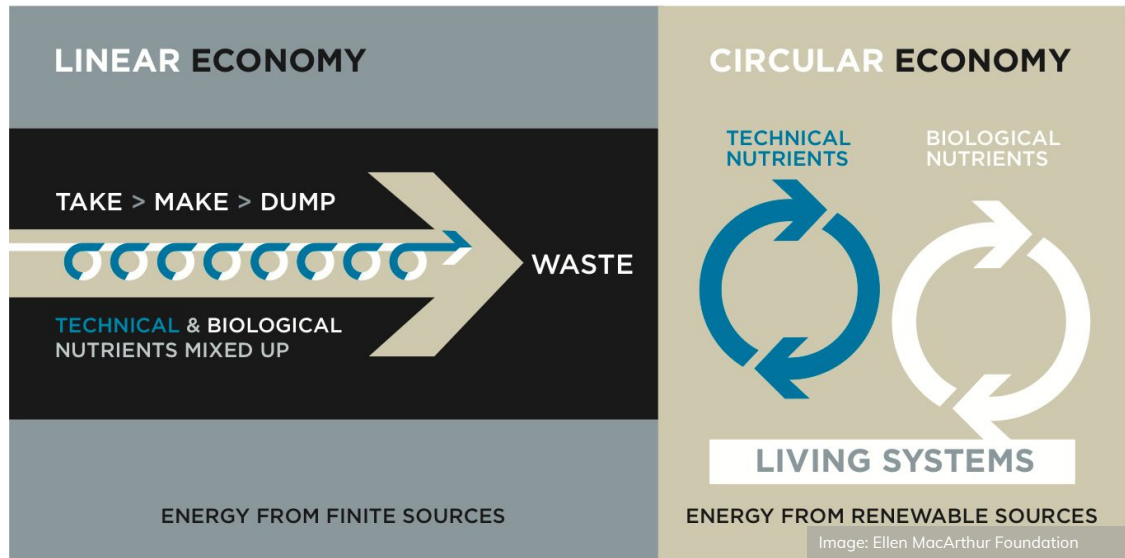
Electronics usage in Asia is growing exponentially. Many of the materials when improperly disposed are highly hazardous to the environment, often leaking toxins into groundwater sources.

4. Waste Tsunami: 3-5x waste generation in Asia by 2025

Current global Municipal Solid Waste generation levels are approximately 1.3 billion tonnes per year, and are expected to increase to approximately 2.2 billion tonnes per year by 2025. Developing Asia's waste generation is projected to grow by not just the world average of less than 2 times, but by a massive 3-5 times by 2025 due to increasing populations and growing consumption rates.



MOVING FROM LINEAR TO CIRCULAR



The linear economy over the past 100 years has been “take, make, dispose” without regard to the loss of materials. Resource efficiency requirements and heightened environmental awareness have popularised the construct of circular economy. It is not that dissimilar to concepts of resource efficiency; reduce, reuse, recycle; closed loop; biomimicry etc. Why it is meaningful is that it gives us a powerful lens to review every process within a framework of material flows and reducing waste or inefficiencies.

In a linear model materials are all mixed together - for example, food scraps are mixed with recyclables and once mixed have little value or cost too much time to clean and separate, and thus end up at landfills. Another example is a shirt made from a mix of cotton (biological ie. biological based) and polyester (technical i.e. man made), which cannot be easily separated to recover the component materials.

A key component of driving the circular economy of materials is to pay attention to the technical and biological components in design, manufacture, distribution and recovery (replacing disposal).



KEY CHALLENGES IN INTRODUCING CIRCULAR ECONOMY TO WASTE MANAGEMENT IN ASIA

INCLUDING:

WASTE TSUNAMI

WASTE MANAGEMENT IS THE LAST PRIORITY

POOR INFRASTRUCTURE

FRAGMENTED GOVERNMENT APPROACH

WEAK LOCAL GOVERNMENT ENFORCEMENT

LOW COLLECTION RATES

OVERLOOKED INFORMAL SECTOR

REQUIREMENT OF MASS BEHAVIOUR CHANGE

REDUCED COMPETITIVE ADVANTAGE

WASTE TSUNAMI IN ASIA

- Growth in waste generation by 3-5x by 2025.
- Exponential growth in plastic consumption. The average Indian uses 11kg plastic per year, whereas the average American uses about 100 kg. As consumption patterns change over the next 8 years, the average indian will be consuming about 30-50 kgs per year.

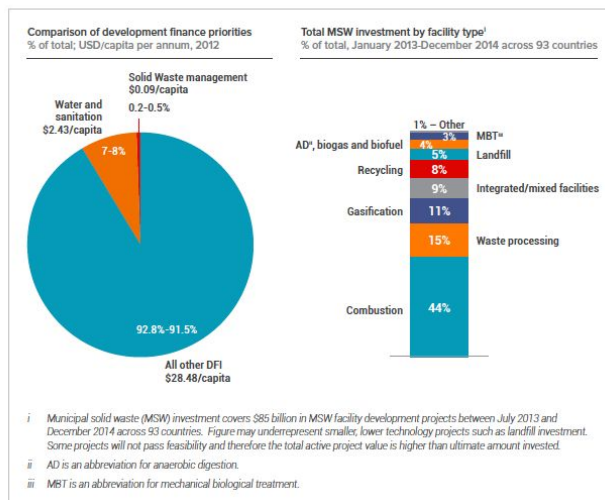


Current global Municipal Solid Waste generation levels are approximately 1.3 billion tonnes per year, and are expected to increase to approximately 2.2 billion tonnes per year by 2025. Developing Asia's waste generation is projected to grow by not just the world average of less than 2 times, but by a massive 3-5 times by 2025 due to increasing populations and growing consumption rates.



WASTE MANAGEMENT IS THE LAST PRIORITY FOR FUNDING

- Despite the demonstrated human health, economic and environmental impact, **less than 0.3% of total Development Finance went to waste management**, compared to 8% for water and sanitation infrastructure (see image on right).
- DFI contributions are generally at the national level, which makes it challenging for cities to access them.
- **Funded programs are targeted at treatment infrastructure**, particularly sanitary landfills and waste to energy, **rather than collection**. Thus, the system is unbalanced, making follow-on investment more not less risky. - Ocean Conservancy, *The Next Wave*, page 30.



Ocean Conservancy, *The Next Wave*, pg 30.

Competing Claims for Budgets

With competing claims such as health, education and poverty on limited resources, waste management doesn't feature prominently in the budgets of developing nations in Asia. Moreover, by being addressed as part of health, environment or resettlement initiatives, waste management in Asia suffers from inconsistent, non-singular treatment.

Lack of EPR (Extended Producer Responsibility) systems

European economies which were a few decades earlier in their economic development curve identified the huge costs to the taxpayers and government associated with household waste collection, separation and treatments and put in place EPR systems funded by producers of packaging materials. The EPR system shifts the bulk of the responsibility for end-of-life management of recyclable products and packaging to producers and consumers and away from taxpayers and governments.

These EPR systems first emerged in Europe in the 1994 Packaging Waste Directive and the 1999 Landfill Directive and continued with regular new directives including the 2011 Roadmap on Resource Efficiency and 7th Environmental Action Program with a vision towards a Circular Economy and a low-carbon society. This has meant that municipal waste in the EU going to landfills has fallen from 300 kg per capita in 1995 to almost 150 kg per capita in 2013. The current EU Packaging & Packaging Waste Directive (PPWD) has an overall recycling target of 55-80% for all packaging.

According to the UNEP and ISWA Global Waste Management Outlook report, for economies aiming to increase collection rates to levels of 95% or higher, spending 1% of Gross National Income (GNI) is considered best practice. In Indonesia, 1% of GNI would translate to about \$70-\$130/metric ton of waste generated. Yet many economies spend far less than 0.5%.

While basic EPR regulations that put the onus of collecting back post-consumer packaging to packaging producers exist in Indonesia and India, both countries do not have a producer fee system embedded in them. In fact Japan is the only country in Asia which has both a robust EPR regulation

and a consistent fee system for packaging producers and importers that ensures that collection, separation and recycling of waste is well-funded and waste leakage is minimal.

GA advocates the creation of a EU-style EPR regulation and EPR fee system for packaging producers in Indonesia, India and the Philippines. Since the government sector's approach to waste management remains highly fragmented we also recommend that the EPR fee system be independently managed by an industry-run non-profit similar to the Belgian Fost Plus model with minimal government involvement in day-to-day operations. This set of EPR regulation and fee system would create a level-playing field for all packaging producers and ensure that all packaging - especially non-recyclable flexible packaging, gets collected and either recycled or incinerated for energy recovery. It would also bring much needed funding to fund the waste management and recycling sector which is severely underfunded today.

There are no official sources of national waste management budget data available for Indonesia. However reports indicate that in 2014 the budget for waste management of the Directorate General of Human Settlements was \$105 million or 0.01% of Indonesia's GNI of \$888.98 billion.

Indonesia produced and imported a total of 4.2 million tons of plastic in 2014. Assuming all of this was plastic PET (most recyclable type of plastic) and a Belgian-style EPR fee of €0.0593/kg was collected, the EPR revenue in Indonesia would be €249 million (\$300 million) which is approximately 3 times the amount that Indonesia is currently allocating for its MSW management. These conservative assumptions show that if properly implemented a Belgian-style EPR would enable Indonesia, India and the Philippines to net a significant amount of additional funding which can then be allocated to further improve waste segregation, collection and recycling services and drive circularity of packaging materials.

The Challenge of Ongoing Lobbying Against EPR

Unfortunately a few packaging and consumer goods industry groups in Indonesia, Philippines and India instead of embracing EPR regulations and voluntarily creating a level-playing fee system are actively lobbying the government against EPR implementation.

One of the common arguments raised by these industry lobbying groups is that waste management is the responsibility of all stakeholders, not just producers and therefore should be looked at as a new framework ESR (Extended Stakeholder Responsibility). This argument is unhappily one of semantics and comes across as a delaying tactic. It does not stand its ground as well-implemented EPR systems such as those seen in Belgium do require all stakeholders to play their roles i.e. EPR and responsibility of all stakeholders are not mutually exclusive. Another common argument is that EPR is a threat to business, a burden to the plastics industry and that it would don't solve the waste leakage and environmental problems associated with packaging. Sadly, there are signs that this industry pressure is paying off - for example the government in Indonesia will exclude F&B packaging from a plastics tax. However these arguments make a fundamental flaw in equating EPR fee to a government eco-tax. A well-implemented EPR fee system would take away the need for a government eco-tax. Also these arguments again are not substantiated with facts or supporting evidence from other countries that have implemented either eco-taxes or EPR fee systems.

In fact, several global companies who in their European operations have accepted EPR fees as a pre-competitive, appropriate cost of doing business and of being responsible corporate citizens are not voluntarily implementing or proposing EPR systems in Indonesia, India or the Philippines.

The Challenge of Piecemeal and Unsustainable Post-consumer Packaging Collection Initiatives

Based on the examples of Bengaluru in India and Depok in Indonesia urban areas across Indonesia, India and the Philippines are likely to take between 1-5 years to significantly increase their household segregation rates. However in the meantime national and local governments must not let this reality be abused by producers and importers of packaging to keep to business as usual when it comes to dealing with post-consumer packaging. The governments must also not condone the on-going smokescreen of several piecemeal, unsustainable post-consumer packaging collection initiatives undertaken by some packaging producers and importers as a permission to keep to business as usual.

From on-ground observations of this research team across India, Indonesia and the Philippines almost all ongoing post-consumer packaging collection initiatives are mere annual box-ticking, Corporate Social Responsibility (CSR) exercises which have a maximum of 5 : 100 ratio in terms of packaging put into the market by the producers vs. post-consumer packaging collected by the producers. These initiatives also cannot be counted as pilots / experiments as in markets such as Indonesia they have been running for over 8 years and have resulted in no significant reduction in plastics leakage into the oceans, minimal improvement of the above-mentioned ratio and compounding of the problem of unsustainable management of post-consumer packaging.

What is all the more disconcerting is that several companies which are lobbying against EPR in these markets follow the mandatory EPR systems in Japan and across various European countries. Even in the United States where overall recycling rate of all MSW remains at a dismal 34.6% and where there has been organized trade association opposition against EPR for decades, voluntary efforts such as the Closed Loop Fund and the Recycling Partnership show signs of a change in the ways some consumer brands view the general concept of EPR.

While these are important developments and demonstrate that legislative pressure in the United States is paying off, the funding provided by these voluntary programs is a drop in the bucket compared with what is really needed to boost recycling in the U.S. For example, the Closed Loop Fund aims to raise \$100 million from companies to loan to local governments to boost recycling but continue public responsibility for managing packaging materials. However, a 2014 analysis showed that New York City taxpayers alone pay \$600 million each year to manage packaging and printed paper.

INADEQUATE INFRASTRUCTURE



Bangalore. Credit: GA

Dry Waste Collection Centre (DWCC), similar to MRF, in Bangalore is too small for the rapid growth in consumption & population.



Jakarta. Credit: GA

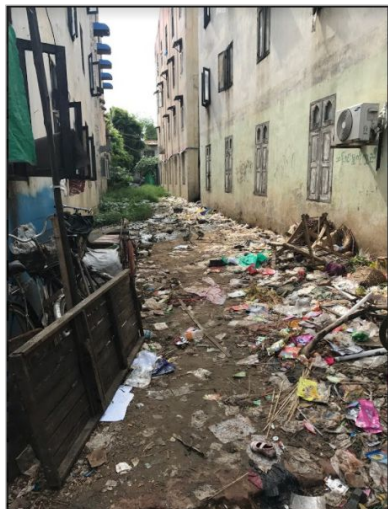
TPS 3R in background with more than 1000m² of space being used as a parking lot for visitors. It does not receive any segregated waste or even mixed waste. The driveway is too small and behaviour of residents hasn't been changed to enable it to receive segregated materials.

Key issues:

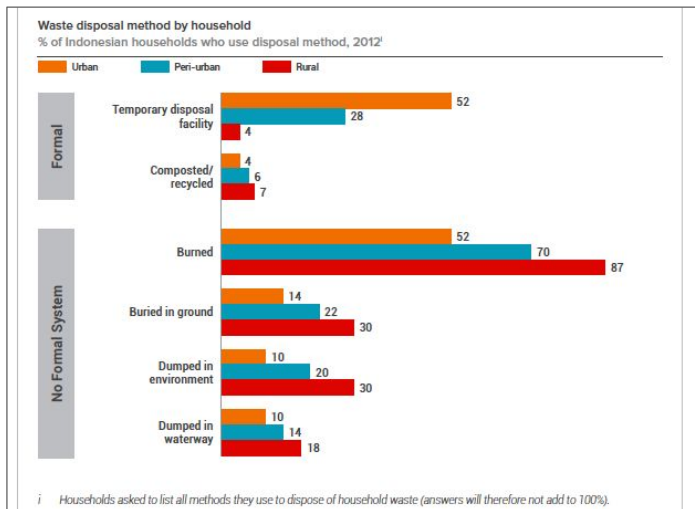
- Infrastructure is set up within the linear framework and not equipped to facilitate recovery of materials. This includes trucks with lack of separate containers for different streams of waste (sanitation, residual) and materials (recyclables, organic materials).
- Infrastructure is built with limited foresight and thus has not kept up with the growing urbanisation. Facilities built and transportation are usually inadequate for the rapid growth in tonnage generated.
- Even in instances where investments are made in infrastructure, there is no accompanying change in disposal behaviour (i.e. segregation of materials) or training/upskilling of workers.

LOW COLLECTION RATES

Metropolitan areas = average of 50-60%. Rural areas = 5% - 20%.



Mandalay. Credit: GA



Ocean Conservancy, The Next Wave, pg 36

Collection rates in Asia are the some of the lowest in the world. On average in Asia, only 50% of urban households and 5-10% of rural households have their waste collected on a regular basis.

When waste is not collected it is dumped into the open environment and often leaks into waterways and the ocean. **It is estimated that 75% of waste leaked into the oceans is from uncollected materials.**

Collection rates are low due to a lack of staff, lack of funding for proper waste management, corruption, bureaucracy and a poor understanding of the importance of collection. For example, Indonesia's rural collection rate is about 10% and urban areas is about 50%.



FRAGMENTED GOVERNMENT APPROACH

In Philippines, The NSWMC has 17 members of which 14 of them are government departments.

1. Department of Environment and Natural Resources (DENR)
2. Department of Health (DOH)
3. Department of Agriculture(DA)
4. Metro Manila Development Authority (MMDA)
5. Department of Science and Technology (DOST)
6. Department of Interior and Local Government (DILG)
7. Department of Public Works and Highways (DPWH)
8. Department of Trade and Industry (DTI)
9. Technical Education and Skills Development Authority (TESDA)
10. Philippine Information Authority (PIA)
11. League of Cities in the Philippines (LCP)
12. League of Municipalities in the Philippines (LMP)
13. League of Provinces in the Philippines (LPP)
14. Liga ng Barangay (LnB)

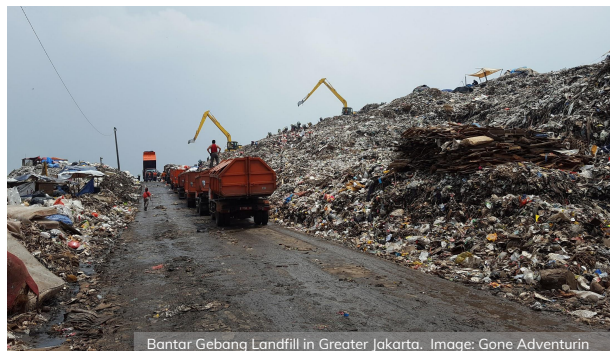
NGOs have been given only 1 member seat while the industry has been given only 2 member seats.

In Indonesia, as many as three ministries - Ministry of Public Works & Public Housing, Ministry of Environment & Forestry and The Coordinating Ministry of Maritime Affairs, are involved in executing various aspects of MSW management.

Countries with successful waste management implementation typically have a single dedicated entity for planning, implementing and overseeing waste management.

In Asia, multiple departments, and a roster of changing leadership and officials prevents proper implementation or a single, consistent strategy. Countries in Asia, on the other hand, have multiple departments and ministries with often differing approaches and competing budget demands with respect to waste management. Quite often initiatives are undertaken by one department may conflict with or undercut other initiatives. Frequent changes in leadership and improper handover result in failed initiatives and disruption of the few successful efforts.

WEAK LOCAL GOVERNMENT ENFORCEMENT



When government doesn't enforce segregation the result is 90% plus of waste is sent to landfill.



Segregated food waste is turned into compost at 1 of 40 Composting Centres in Depok. When materials are segregated in houses, more than 70% of materials can be diverted from landfill.

Waste management policies are often formulated at the national or state/province level, but are left to implemented by local and municipal governments without regard to available resources (particularly skills and funds). Moreover, the particular local requirements based on geography and demographics are sometimes overlooked with a central/national directive.

There is little government or legislative support to push segregation and recycling/recovery of materials. Laws regulating segregation, collection and means of disposal are rarely enacted and poorly enforced, if at all. Laws governing the treatment hazardous waste and introducing producer and manufacturer liability are not rigorously adapted to local conditions and have limited enforcement strategies to allow for circular economy solutions.

Even where businesses are eager to apply their labeling and disposal standards, system failures prevent successful application. Changing local officials and changing directives from the central authorities impact the consistent application of any waste strategy adopted.

Some local governments, having recognised the need for source segregation have commenced the enforcement of fines/ non collection in case of unsegregated waste. For. e.g. Depok in Indonesia and some parts of Bengaluru, India have seen greater success in recovery of materials from waste upon enforcement of source segregation rules.



WEAK LOCAL GOVERNMENT ENFORCEMENT

Depok is the example of why local government enforcement of segregation, collection and no-littering is critical.

ENVIRONMENT
Depok: The front line in Indonesia's fight against waste

JP PAULA MIQUELIS AND ASHWIN SUBRAMANIAM

Jakarta | Mon, August 21, 2017 | 09:42 am

212 SHARES

Waste is rapidly becoming one of the most pressing issues of all time. More than a decade after Bandung's Lembangh dumpsite disaster in West Java in which 143 people died buried under a waste avalanche, there is still no strict law enforcement to divert waste from filling up landfills.

Some laws such as the 2008 Waste Management Law, enacted more than nine years ago, have required Indonesian citizens to sort their waste to increase the 3R (recycle, reduce, reuse) system in each municipality. However, those laws have shown very limited results. Segregation rates among households in Indonesia remain persistently low according to Waste4Change, a local waste-management organization.

Worldwide, 8 million tons of plastic end up in oceans every year, 16 percent of which comes from Indonesia as the second-biggest contributor. In 2016, the country alone generated 3.2 million tons of plastic waste, of which 1.29 million ended up in the oceans. Fortunately, Indonesia has pledged to put up \$1 billion a year to reach a 70 percent reduction in marine waste by 2025 at the World Oceans Summit in March 2017.

The national government should look at some local communities in Depok that

Article by GA.

Depok City: The front line in Indonesia's fight against waste

Video by GA.

Jakarta Post Article Link:

<http://www.thejakartapost.com/life/2017/08/21/depok-the-front-line-in-indonesias-fight-against-waste.html>

Video Link:

https://www.youtube.com/watch?v=z_A53wfd2p8

Depok, a city of Greater Jakarta, is the first city in Indonesia to have enforced segregation en-mass to a total of 100,000 households within a specific area (selected wards). This is about 22% of Depok's 450,000 households and 2.1 million population. Prior to 2012, household waste segregation was practically unheard of until Pak. Zamrowi Hasan, the Head of the Cleanliness Department of Depok decided to launch a new system called Partai Ember ("the Bucket System"). He was inspired by the segregation and zero-waste efforts of Osaki in Japan to combat the overflowing landfills in Depok, leachate leakage into waterways and landslides over recent years.

Indonesia's Waste Management law from December 2008 (No. 18/2008) requires all citizens to separate their waste for recycling. However implementation and enforcement of the law, plus behaviour change campaigns have been limited, so less than 5% of citizens nationwide segregate and when they do, the government or contracted waste collector often mixes the materials back together.

Through Depok's Bucket Party "Partai Ember" system, the 100,000 residents in the selected wards are required to segregate their waste into 'buckets' for organics, recyclables, and residual waste. Organic waste is sent to community level composting centres (called UPS) where it is turned into compost. Inorganic recyclable materials are sent to community waste banks (bank sampah) and then sold to recyclers. The residual waste (Inorganic and non-recyclable waste) is sent to the landfill.

As flexible plastics and multi-layered laminates currently do not have a recycling market, the majority are categorised as residual and are being sent to the landfill. A small amount

(less than 10%) of flexibles are sent or sold to waste banks to be upcycled. There were only 3 waste banks before the launch of Partai Ember, but by 2016 there were 400 'waste banks' to serve the 2000 wards of Depok.

Before implementing this program, there were 40 UPS (now composting centres) in Depok City of between 300-600m² which were only being used as transfer stations for mixed waste, where the mixed waste picked up small carts from households would be aggregated into a big dump truck to take mixed waste to the landfill. Once the city achieved household segregation these UPS have been converted into highly successful composting centres, each processing 1-3.5 tons of organic inputs per day.

The key enablers for segregation success in Depok city have been:

- **Enforcement.** The cleanliness department of the city government refused to pick up the waste if the households didn't segregate. While this was, at first, thought to be an empty threat as the government had tried to enforce segregation in the past, after two or three days of residents' waste not being picked up and calling up to complain to no avail, the residents realised they needed to segregate in order to get their 'waste' (now material streams) picked up.
- **Fines & 'waste police'.** If any individuals were caught throwing their household trash into the rivers or open environment they were fined INR 150,000 to 200,000 (USD 11 to 15) and taken to court. The fee was minimal, but in being sent to court they had no choice but to plead guilty and this was then often covered by media. All of this raised awareness that if you litter into the open environment or don't segregate, you'll be sent to court. Over 1 year, 300 people from Depok were sent to court. A total of 25 waste police were covering the 100,000 participating households of Depok as well as the greater area of Depok, as the city soon realised people would travel to a different area to dispose of their waste - e.g. throw out of their motorbike or car on the way to work. Note that the police were not new hires, but were just transferred from other duties, so this is a process easily transferable to other parts of Indonesia and the region.
- **New collection schedules & different vehicles** for each material type. Depok changed from mixed collection (where all materials were collected at once and mixed together, even if the household was segregating) to different collection vehicles to ensure that the materials were not mixed up by the collectors. A small vehicle is used to transport the organic waste from households to the UPS of the ward. The recyclables are transported to the waste banks. And a different truck is used to transfer the non-recyclable / residual waste to the landfill.
- **Financial incentives for households.** Households that segregate their materials receive the benefit of no longer needing to pay their waste collection fee of IDR 15,000.
- **Sister City Partnership & Learning.** Since 2012, one hundred representatives from Depok per year have been visiting their sister city, Osaka, in Japan, to learn about waste management and cleanliness. However nothing happened as a result of this learning until Pak Zamrowi committing to creating an action plan and to continue implementing until success achieved. He credits Osaka with much of his

- learning and knowledge to be able to implement the program: “We could not have done it without the knowledge, learning and technical support from Osaki” - Pak Zamrowi.

If the remaining 350,000 households and all bulk waste generators (buildings, schools, etc) of Depok City segregate, then a total of 900 tons (75%) of materials would be diverted from landfill out of the current city wide generation of 1,200 tons per day.

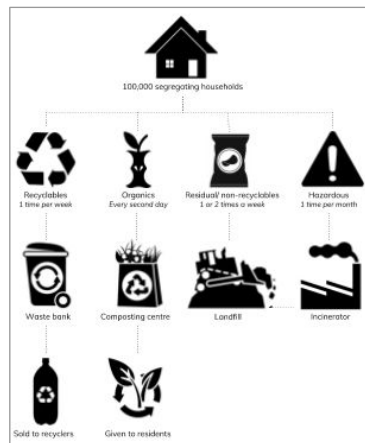
WEAK LOCAL GOVERNMENT ENFORCEMENT

Depok is the example of why local government enforcement of segregation, collection and no-littering is critical.

Item	Tons	%	Sent to / End State
Total Generation from 100,000 households	168	100	
Organic	104	62%	Composting Centres (UPS) & Compost
Recyclables (metal, plastic, paper, card & minimal amounts of flexibles)	23.5	14%	Waste Banks & Recycled
Diverted from Landfill	127.5	76%	
Reject/Residue - made up of:	40.5	24%	Landfill
<ul style="list-style-type: none"> Reject/Residue (non recyclable items such as flexible plastics, plastic bags) Reject/Residue (non segregated, sanitary/medical waste such as diapers, sanitary napkins, textiles, wood) 	17	10%	
	23.5	14%	
Sent to Landfill	40.5	24%	

Calculations by GA.

76% of materials diverted from landfill



By GA.

Collection schedule under new system

Within a year of implementation, 100,000 households (with a population of about 500,000 people) have been complying in segregating at home, which enables about 75% of materials (or about 127 tons per day) to be diverted from landfill every day. :

An additional 10-30 tons per day of city landscape organic matter from the whole of Depok City is also diverted from landfill and sent to UPS for composting.

As can be seen above, non recyclable plastics make up about 10% or 17 tons of materials per day - which includes flexible plastics (sachets, pouches, films, wrappers) and a significant amount of plastic bags. As these are not recyclable technically or economically, they are sent to landfill. A small amount is additionally sent or sold for a small amount to waste banks in Depok and then upcycled into handicrafts, but this is less than 1-2% of all flexible plastics.

With an effective technology and end use for flexibles in the vicinity of Greater Jakarta, a total of 17 tons of flexibles could be diverted from landfill every day from Depok city currently. And once the whole city segregates, 120 tons per day.

Comparing other cities against Depok.

Throughout Indonesia there are thousands of TPS's, which are buildings or covered roofs, that were built with the intention that they would be places for materials to be segregated. However, they ended up just becoming transfer stations for mixed waste - i.e. the mixed waste would be picked up from households by small carts, dropped at the TPS and then loaded into a large truck to be taken to the landfill.

Upon realising the TPSs were only being used as transfer stations the Indonesian government started building TPS 3Rs, which are larger and similar in size to Depok's UPS's (ranging from 200m² to 1000m²), with the vision that these would be used to receive already segregated household material streams. However, these TPS 3R's are still working similar to the old TPSs - essentially aggregation stations for mixed waste. The cities of Malang and Surabaya are often seen as leaders in waste management, but their TPS 3Rs aren't receiving pre-segregated materials, but are instead merely trying to segregate mixed waste under a roof. Thus, they are both extremely ineffective and inefficient when compared to Depok.

BEHAVIOUR CHANGE CAMPAIGNS



Infrastructure not used in Mandalay. Credit: GA



Depok Segregation. Credit: GA

Infrastructure is built without addressing behaviour change needs. Communities and populations accustomed to forms of waste disposal suitable to small quantities of organic waste need to be educated to understand the complexities of increasing quantities and changing composition of waste.

The most important area of behaviour change is segregation. All materials will be waste and destined for landfill or the incinerator, unless they are segregated at the household level.

Other changes in behaviour required include:

- Maintaining surroundings
- Valuing the infrastructure - often it is misused and damaged
- Respect for the informal sector / waste collectors. The best example is in Taiwan where waste collectors are valued in the economy and often remunerated on par with professional workers.
- Participation in a multi-stakeholder approach - unless communities, waste collectors and government collaborate, results will be hard to come by.



The key shift in perception required is one where we no longer see disposed items as waste, but as materials having high intrinsic value which can and must be recaptured.

OVERLOOKED INFORMAL SECTOR



Poor conditions in Mandalay, Myanmar. C: Gone Adventurin.



Empowered informal sector in Bangalore. C: Gone Adventurin.

Legitimacy - The informal sector (rag pickers / waste pickers) often don't hold ID cards and thus can't open bank accounts, access healthcare.

Steady Income - Need to integrate and move up value chain - i.e. from scavenging materials on landfills to instead doing door to door collection from households and becoming micro-entrepreneurs at recycling centres (Materials Recovery Facilities).

Respect - Respect the informal sector / waste collectors. The ultimate example is Taiwan where waste collectors are valued in the economy and often remunerated on par with professional workers.

Health Insurance & protection equipment - Absence of health insurance and/ or protective gear for waste collectors especially as unsegregated waste includes hazardous materials results in low levels of engagement with the waste sector. By providing incentives and healthcare, the waste worker community can be strengthened and mobilized.

The informal sector in India has 3-4 million people. Mobilizing this segment of the population not only improves their way of life but also creates a strong and empowered task force. Waste pickers see first hand the environmental impact from waste and can be the some of the best advocates for circularity.



LOW CONSUMER AWARENESS AND DEMAND FOR FOR RECYCLING/ RECYCLED CONTENT

- Local markets and communities in Asia, with rising consumerism, are yet to embrace the consequences of waste generation and leakage.
- Competing with large MNC's that benefit from economies of scale, and developed product strategies, local manufacturers are at a disadvantage if they have to invest in alternative technologies/ design to ensure a better disposal of their product or packaging.
- General misconceptions with respect to the reuse of materials especially for food and home care packaging prevent the adoption of such strategies to reduce waste and also to provide an end market for "waste"



GA'S APPROACH

ADVISORY

- Regionally focused research reports
 - e.g. flexibles, EPR
 - Data Collection
 - Waste Characterisation
 - Economic Assessments
- Scoping for FMCG & Packaging industry
- Workshops & Awareness Building

ACTION

- Multi-stakeholder 6-18 month deployments throughout region
 - Capacity building local waste businesses
 - Creating closed loop solutions for companies
 - Engaging government, households and NGOs
 - Strong data tracking
- Storytelling / Behaviour Change campaigns



EXAMPLE OF ACTION SERVICES BY GA

Multi-stakeholder 12 month deployment in Manila with DOLE Foods, Mother Earth Foundation, DENR and local government units.



DEPLOYMENT IN MANILA WITH DOLE FOODS & SCHOOLS

July 13, 2017

Share 120 Tweet

Dole Philippines Launches 'Sunshine Heroes' to Save PH from Garbage Crisis

HOME Blog Dole Philippines Launches 'Sunshine Heroes' to Save PH from Garbage Crisis

The world's largest producer and marketer of fresh fruits, **Dole Philippines**, in partnership with **Gone Adventurin** and **Mother Earth Foundation** and supported by the **National Solid Waste Management Commission (NSWMC)**, introduced the company's newest sustainability campaign called **Sunshine Heroes**.



MRF Form

0/6 questions answered

- 1 Paper and Cardboard (Kgs) *
Tap to enter number
- 2 Recyclable Plastic (Kgs) *
Tap to enter number
- 3 Metals (Kgs) *
Tap to enter number
- 4 Organic (Kgs) *
Tap to enter number
- 5 Residual (Kgs) *

SUBMIT

Case study here: http://www.goneadventurin.com/portfolio_page/dole/

Summary video here: <https://www.youtube.com/watch?v=7xwwUxMr0hI>

News articles here:

<http://primer.com.ph/blog/2017/07/13/dole-philippines-launches-sunshine-heroes-to-save-ph-from-garbage-crisis/>

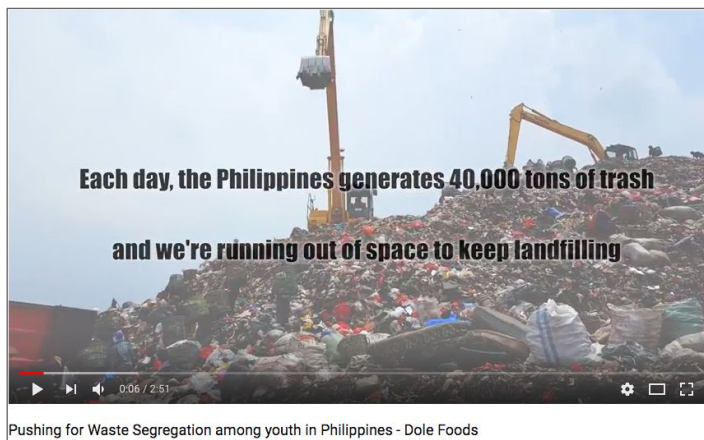
<http://manilastandard.net/business/biz-plus/242568/fruit-company-wants-filipinos-to-stop-polluting-pacific-ocean.html>

<http://astig.ph/dole-philippines-spearheads-sunshine-heroes-campaign/>



DEPLOYMENT IN MANILA WITH DOLE FOODS & SCHOOLS

Summary Video:



Video Link:

<https://www.youtube.com/watch?v=7xwwUxMr0hl>



DEPLOYMENT IN MANILA WITH DOLE FOODS & SCHOOLS

- Enabling DOLE's Closed Loop goals in addition to brand and PR
- Fulfilling government law of 1 MRF per school
- Multi-stakeholder : government, NGOs, citizens, companies
- 5 schools covering 15,000 students in Quezon City and Malabon
 - 95% segregation success
 - 85% diversion from landfill
- Behaviour Change campaigns
- MRF in school is self sustaining - recyclables cover schools staff costs
- Expansion plans





EXAMPLE OF ADVISORY SERVICES BY GA

Regionally focused research report on Flexible Plastics in India, Indonesia and Philippines, with an objective to determine best collection efforts and processing technologies per market, in order to capacity build knowledge in the region and invest in best solutions.



FLEXIBLES COLLECTION & PROCESSING REPORT

TO BE RELEASED IN NOVEMBER

	CO-PROCESSING CEMENT KILNS	DEPOLYMERISATION (PYROLYSIS)	PLASTIC ROADS	CONVERSION TO FURNITURE	SOLVOLYSIS
REGULATORY SUPPORT	India: Govt. guidelines for 5% alternative fuels.	India: Govt. subsidies exist in for land near landfills. PH: Banned due to Clean Air Act.	Regulations support in India and Indonesia.	PH: one of the few processing technologies allowed under Clean Air Act.	No legislative support to date. PH: will be allowed under Clean Air Act.
INFRASTRUCTURE SUPPORT	Existing cement kilns in all markets	4,000,000 USD per 40 tons per day (TPD) plant	100,000 USD in case of wet mix process.	200,000 USD per 60 tons per month plant (i.e. 2 TPD)	Unknown. Plants believed to be expensive.
END USE / FINANCIAL BENEFIT	Reduces production costs - as plastic cost per calorific value is lower than petroleum coke	Hydrocarbons returned to oil. However, challenge of fluctuating oil prices.	Lower cost & stronger roads. Significant demand for roads.	Furniture sold at market price, making plants financially sound.	Turned into monomers, in demand by industry. Still challenged by price fluctuation. Buying material at 0.10 USD/kg.
PROCESSING CAPACITY / SCALABILITY	Up to 30 TPD of flexibles (total capacity is 300 TPD of oil inputs currently). Expanding to 650 TPD in 2019.	40 TPD per plant	Small amount used per km.	2 TPD per plant	30 TPD per plant
DEGREE OF CIRCULARITY	Enables reuse of flexibles as energy input for Cement, reducing virgin energy needs.	Turns plastic into oil.	Flexibles reused for road input rather than using virgin material.	Flexibles reused for furniture rather than using virgin material.	Enables full circularity of flexibles back into flexible plastics.
ENVIRONMENTAL RISK	Very little, all combusted. Additional processing & greater transport distance is needed.	Very little, provided factory is high quality.	Potential for micro plastics / fumes. Limited environment assessments completed.	No waste bio-product. Low toxicity.	Some waste product to be managed.
PRE-PROCESSING NEEDS	Can receive all flexibles. Must be dry & shredded.	In house cleaning by plant. Can only have XX% of metal laminates.	Only a small percentage (< 25%) of flexibles can be used. Higher demand for LDPE & rigid.	Minimal. Can take up to 30% metal laminates, which is more than market usage proportion. Must be cleaned.	Can only take in PE material types & maximum of 30% metals. All PP must be removed.

Example charts from GA's report on Flexibles Collection & processing efforts in India, Indonesia and Philippines. Report to be released in November in collaboration with packaging company client.



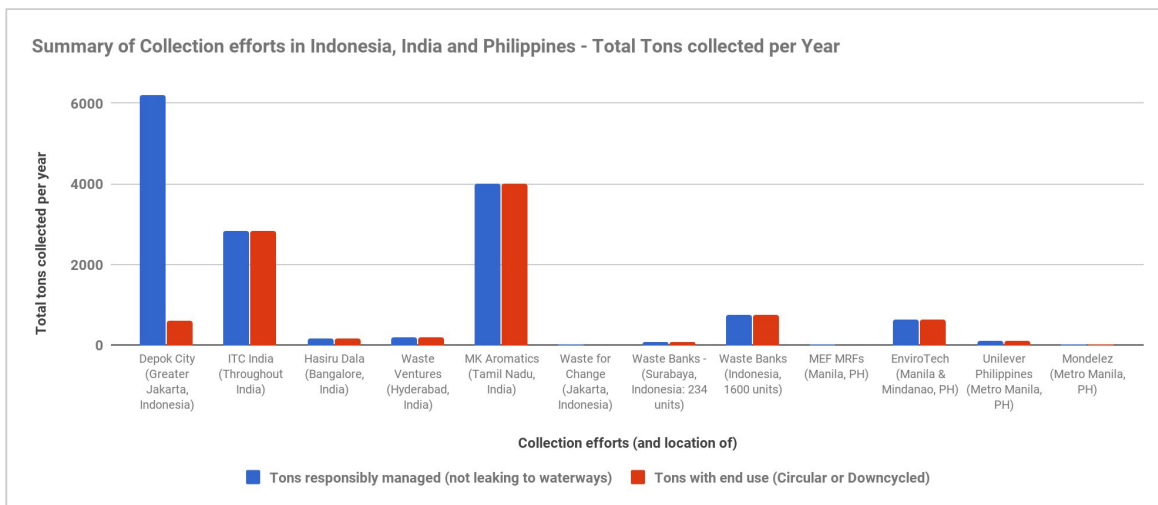
FLEXIBLES COLLECTION & PROCESSING REPORT TO BE RELEASED IN NOVEMBER

	COLLECTION					SORTING		END USE			SUMMARY	
	SEGREGATION LEGISLATION & ENFORCEMENT	WORKER TRAINING	DRIVING EDUCATION & CULTURE	CROSS SUBSIDY	CASH INCENTIVE FOR COLLECTION	MRF (ACCESS TO, OR OWN)	HAS EQUIPMENT TO BALE	TRANSPORT SUBSIDY / COVERED	SCALABLE END USE IN PLACE	COMMODITY MARKET	YEARLY TONS COLLECTED WITH END USE	EFFECTIVE END USE & SCALABLE
HASIRU DALA (KARNATAKA, INDIA)	City legislation requires segregation, enforced in pockets	Financial assistance, empowers entrepreneurs	Through workers, waste management roundtable, PR	Collecting all material types	< 0.10 USD for existing pilots. Needs to be increased to cover costs.	Has access to 62 government EWSOs	Has in 1 ward. Needs in others to maximise efficiency.	Cement plant pays transport	Cement Co-Processing	Currently no. Cement plants may need to pay in future.	180 Could do xxx if paid more.	Highly scalable
WASTE VENTURES (HYDERABAD, INDIA)	City not driving segregation, WW driving segregation.	Financial assistance, empowers entrepreneurs	Through workers, focused campaigns	Collecting all material types	< 0.10 USD for existing pilots. Needs to be increased to cover costs.	Operates 1 large DWCC (MRF)	Has in 1 facility.	Cement plant pays transport	Currently small scale Pyrolysis. Working to send to cement.	Currently no. Cement plants may need to pay in future.	200 Could do 360 if paid more.	Highly scalable
DEPOK CITY (INDONESIA)	Enforced in select area of 100,000 Households.	Separate collection schedules.	Socialisation sessions. Waste police.	Collecting all material types	No payment needed as city managed collection.	Has access to waste banks	No for waste banks.	Government paying transport. Majority sent to landfill.	Some sent for recycling & hand-crafts. Majority sent to landfill.	Some downcycled. Hand-crafts not scalable. Majority landfill.	602 of 6,205 Needs end use solution. Majority landfilled.	Highly scalable. Just needs end processing solution
UNILEVER'S WASTE BANKS (1600 ACROSS, INDONESIA)	Legislation requires segregation but no enforcement.	Training supported by Unilever & waste bank leaders.	Socialisation sessions.	Collecting all material types	< 0.05 USD to date. Needs to be higher to incentivise higher reach.	Unilever has supported with infrastructure.	No.	No. Waste Banks Pay.	Handicrafts & some downcycling.	Some downcycled. Handicrafts not scalable.	740 (Indonesia) 81 (Surabaya) Needs more scalable end use solution.	Unlikely to scale as income rise.
WASTE 4 CHANGE (INDONESIA)	Legislation requires segregation but no govt enforcement.	Trains workers.	Through workers, focused campaigns	Collecting all material types	Charges less than < 0.60 for monthly waste collection per HH	Owns MRF on loaned land.	Has some equipment.	Paying transport & landfilling costs.	Landfill.	Currently no as landfilled. In future could send to Solvolysis.	0 out of 10 collected. Needs end use solution.	Scalable. Needs end solution & govt enforcement of segregation.
MOTHER EARTH FOUNDATION MRFS (PHILIPPINES)	No segregation legislation. Left to barangays to educate and enforce.	Empowering & training barangays with knowledge	Educates communities through events	Collecting all material types	No incentive. Barangays doing collection of all inorganic.	Barangay pays for infrastructure & is on barangay land.	Sometimes.	Paying transport & landfilling costs.	Landfill.	Landfilled. Against processing solutions due to Clean Air Act.	0 out of 10 collected. Needs end use solution.	Scalable. Needs end solution & govt enforcement of segregation.

Example charts from GA's report on Flexibles Collection & processing efforts in India, Indonesia and Philippines. Report to be released in November in collaboration with packaging company client.



FLEXIBLES COLLECTION & PROCESSING REPORT TO BE RELEASED IN NOVEMBER



Example charts from GA's report on Flexibles Collection & processing efforts in India, Indonesia and Philippines. Report to be released in November in collaboration with packaging company client.



ADB x GA COLLABORATION OPPORTUNITY

- Integrating Circular Economy Framework to existing and future ADB tenders.

GA can support by identifying potential in target areas and drafting circular economy and waste management targets to be included in ADB tenders.

- Developing a Circular Economy Template for Cities : to highlight cost savings in applying the circular vs. linear approach.

Using our methodology and comparison models we can help local government units (wards, cities, provinces or nationwide) compare and contrast costs and savings in switching from a linear to circular approach to waste management.

- Implementation of Framework and Creation of Tool Kit for each DMC taking into account local demographics and conditions.

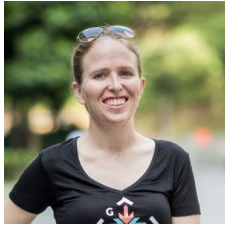
GA can assist with scoping studies and pilot implementations of Circular Economy framework within Waste Management - towards development of a Tool Kit to scale into additional areas.

- Extended Producer Responsibility (EPR) - Developing a suitable EPR framework for different DMCs and exploring tax strategy per material type.

GA can assist with comparing, analysing and adapting existing and potential EPR frameworks to be adopted by DMCs .

- Roll out large scale behaviour change campaigns targetting source segregation as the key step to effective circular waste management.

GA can assist in mapping, developing and creating content and strategy for large scale campaigns, using key behaviour change tools and identifying behaviour change triggers for particular target areas.



LAURA ALLEN
COO & Co-Founder

laura@goneadventurin.com
+65 9447 3790



SUMANGALI KRISHNAN
Head of Research & Strategy

Sumangali@goneadventurin.com
+65 9025 2076

Certified



Gone Adventurin Pte Ltd
128 Prinsep Street, Singapore, 188655 GoneAdventurin.com