



CIRCULATE CAPITAL



Investing to reduce plastic pollution in
South & Southeast Asia:

A HANDBOOK FOR ACTION

Circulate Capital (2019)

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Foreword

In recent years, there has been growing awareness internationally of the crisis of plastic waste and its leakage into our world's ocean. In fact, research informs that we are only beginning to grasp ocean plastic pollution implications for humanity and the health of the planet. Over 800 species of marine life are known to be impacted by plastic, and newly found plastic particles in drinking water and fish for consumption indicate we have much to learn about how this pollution impacts people.



Rob Kaplan
Founder & CEO

It's time to significantly reduce the global leakage of plastic waste into the ocean – and that means working together to implement solutions where the majority of the plastic enters this expansive body of immense natural resources.

Circulate Capital, an impact-focused investment management firm, initiated by Closed Loop Partnership and Ocean Conservancy, has created a new financing mechanism to divert plastic from the environment. With funding and collaboration from public and private sources, our firm aims to remove capital barriers to the development of waste management and recycling infrastructure, and to support innovative solutions to ocean plastic issues. Our focus is on countries in South and Southeast Asia, regions that disproportionately contribute to ocean plastic pollution.

There is no “silver bullet” we can employ to stop plastic pollution. We can neither recycle nor reduce our way out of the problem. While both of these actions must be pursued, it is necessary to evaluate other solutions, including the redesign of the packaging and products we produce and sell, as well as intercepting waste as early as possible.

The seminal 2015 research paper on marine debris by Dr. Jenna Jambeck and colleagues showed that Asia accounts for over half of the mismanaged plastic waste that leaks into the world's ocean.¹ This research also indicated that most of this plastic either escapes from waste management systems through overburdened landfills and poor collection practices, or is simply never collected in the first place. At the same time, the region has experienced extraordinary economic and population growth, with corresponding increases in consumption of consumer and other goods, many of which are made of and/or packaged in plastic. While economic development, and the reduction in poverty it brings, is to be celebrated, investment in solid waste management (SWM) systems and infrastructure in the region has severely lagged this growth, increasing the potential for plastic waste leakage. To solve this problem, we must address the deficit in infrastructure investment.

The required investment in Asia's waste infrastructure amounts to hundreds of billions of dollars. However, investors – particularly institutional investors – have shied away from investing in this sector. There are a variety of reasons for this: prime among them is a “missing middle” of investible entities that demonstrate a track record of profitability and growth, and which offer a robust pipeline of prospective investment opportunities for potential investors.

In support of our work to strengthen waste collection and recycling systems through institutional investment, in 2018 – together with our corporate partners and Ocean Conservancy – we announced over US\$100 million in commitments toward the creation of the funding mechanism. Circulate Capital aims to blend concessionary and philanthropic monies with market rate investment capital to unlock institutional funding by showing that investment in the resource recovery sector can ultimately provide attractive financial returns.

By open-sourcing our findings and investment strategies related to ocean plastic pollution, and through this handbook, we aim to improve information available and encourage participation of investors interested in this space. We hope to demonstrate that investment in the solid waste and recycling can provide beneficial financial and environmental returns, catalyzing additional capital for the sector. The handbook is based principally upon an assessment of the investment landscape in countries that are large contributors to, and highly impacted by, plastic waste in South and Southeast Asia: India, Indonesia, the Philippines, Thailand and Vietnam, the “SSEA countries.” The review was a core element of the Closed Loop Ocean initiative supported by Dow, Procter & Gamble, Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), The Coca Cola Company, Kimberly-Clark, PepsiCo and the American Chemistry Council with assistance from Ocean Conservancy. The initiative led to the founding of Circulate Capital in 2018.

Circulate Capital brings patient, catalytic financing to the waste management and recycling sector. But we do so without ever forgetting the fierce urgency of investing in solutions now, as befits the magnitude of the problem that ocean plastic leakage represents.

This handbook seeks to provide the most important and useful information about the potential for investment in SSEA countries’ waste management infrastructure. It first explores general themes across the five countries and then specifically addresses two countries in the group, India and Indonesia. We encourage interested investors to contact us so that we may share additional findings that emerge from our investments in the sector.

Rob Kaplan
CEO and Founder
Circulate Capital

OCEAN CONSERVANCY

Of all the threats facing the ocean today—whether it's warming waters or overfishing or anything else—plastic pollution is among the most visible, and perhaps the most visceral. It tugs at our heart strings, and in our digital age, it doesn't take long for a video of trash-filled beaches or of a turtle with a plastic straw stuck up its nose to stir calls for change.

What that change should look like is less obvious. Ocean Conservancy has been at the forefront of the fight against marine debris for more than three decades, mobilizing some 14 million volunteers to remove 250 million pounds of trash from beaches and waterways around the world through our annual International Coastal Cleanup (ICC). It's an incredible effort of which we are very proud, and one that has generated excitement from citizens, as well as public and private partners, since its inception.

And yet we know that clean-ups alone cannot solve the problem. As we often say, you don't start mopping your flooded basement until after you've turned off the tap.

In 2015, scientists identified that tap, estimating that a majority of the 8 million metric tons of plastic entering the ocean every year leaks from just a few countries in Asia where trash collection and recycling systems have not kept up with growing populations and economies.

The findings revealed a whole new strategy to pursue—and a whole new way to engage the private sector. If we are to keep plastic—and any other trash, for that matter—out of the ocean, we need to start by making sure it is collected and disposed of properly in the first place, particularly in places where it's most likely to leak out. Ocean plastic is, among other things, a development issue requiring significant capital investment, and with significant benefits to society beyond the ocean.

That's where Circulate Capital comes in. Ocean Conservancy leveraged our longtime partnerships with the private sector around the ICC to help establish the world's first catalytic capital firm aimed squarely at financing innovation, companies, and infrastructure to prevent ocean plastic pollution. From a company in India that collects waste plastic to create building materials to the entrepreneur in Indonesia that wants to expand her recycling facility, there are opportunities to invest in solutions that not only keep plastic out of the ocean, but provide good jobs for people, and help communities address challenges of waste management.

Understanding that the role of catalytic capital is to show the way for other investors, in this handbook Circulate Capital is making public proprietary information that would normally be a jealously guarded secret in order to “crowd in” other investors. This openness is exactly the sort of initiative Ocean Conservancy seeks to foster – building collective knowledge and inspiring collaborative action to save our ocean today and protect it for the future.

We hope you'll join us.

Janis Searles Jones
CEO

Ocean Conservancy



Ocean Conservancy®

PEMSEA

The past three years have seen marine litter becoming one of the most pressing global and urgent issues with several calls to action and the development of master plans by key governments with the participation of businesses and other stakeholders. Key to operationalizing these calls to action and implementing the master plans is unlocking finance and investment in innovative and integrated waste management systems and solutions tailored to local conditions.

PEMSEA Resource Facility welcomes the development of this handbook based primarily on the investment landscape assessment work undertaken in the South and South East Asian region in 2018. It provides basic reference material focused on the prospects for investing in the waste management and recycling sectors in India, Indonesia, the Philippines, Thailand and Vietnam. It looks into potential investment opportunities and activities in three segments of the plastic waste value chain: collection, aggregation, and processing of/end market for plastic waste.

The basic handbook was developed with the strong belief that open-sourcing the findings and investment strategies will improve the information available and encourage participation of investors interested in marine pollution reduction and waste management in the region.

PEMSEA will continue to work with Circulate Capital and its sister organization Circulate Initiative in producing other knowledge products that will supplement this handbook as the experience of working collaboratively with key actors in the region on innovative and integrated waste management systems and solutions progresses.

Aimee T. Gonzales
Executive Director

Partnerships in Environmental Management for the
Seas of East Asia (PEMSEA)





International awareness of the crisis that the leakage of ocean plastics presents has been growing.

Executive Summary

Recent disclosures concerning the presence of plastics passing through human digestive systems serve to emphasize how little is currently known about the longer-term effects these materials will have on marine species, and the impacts to food, water and human systems.²

Much of the plastic waste leaking into the world's ocean comes from countries in South and Southeast Asia, the result of ineffective, under-developed integrated waste management systems. The absence of waste management and recycling companies with strong and transparent track records of profitability, combined with questions about the bankability of infrastructure projects, has prevented institutional investors from allocating capital to these projects. In fact, the Top 100 Asian institutional investors have allocated less than half-a-percent of their assets under management to the infrastructure sector, generally.

In late 2017 and early 2018, Circulate Capital undertook an assessment of the prospects for investing in the waste management and recycling sectors in SSEA countries (India, Indonesia, the Philippines, Thailand and Vietnam) as a core element of the Closed Loop Ocean initiative³. This handbook draws heavily upon that exercise. Three segments of the plastic value chain were the focus of the assessment: collection, aggregation and processing of/end markets for plastic waste.⁴ The following sections outline key findings from the assessment.

Comprehensive national solid waste management legislation, but implementation challenges

The SSEA countries that form the focus of this handbook are a diverse group. Yet, they share the commonality of being middle-income countries with unfinished development agendas. Despite comprehensive national-level legislation governing the collection and management of household waste, and action plans on marine plastics in some cases, each country still has lagging solid waste management (SWM) infrastructure, resulting in mismanaged plastic that enters the environment and the ocean. The reasons for this are varied but include lack of enforcement of existing SWM laws and regulations, for example, with respect to mandating separation of waste at source, and prohibiting illegal dumping and burning of waste by households.

These challenges are often exacerbated by weak governance and lack of transparency at various levels of government. And, while certain aspects of the countries' waste management systems may differ – such as collection rates in Indonesia are poor, while relatively good in the Philippines – they are all characterized by insufficient operating and capital expenditure budgets at the local level, where responsibility for waste collection and management ultimately resides. The financial weakness of these local governments in turn deters the necessary flow of capital to the SWM and recycling sector.

Extended producer responsibility and other waste plastic management approaches

Cognizant of the need to invest in SWM systems and the growing problem of plastic leakage, governments in the SSEA countries are exploring a variety of SWM approaches. Among them, India is making an effort by putting in place an extended producer responsibility (EPR) regime and, under the Modi government, seems determined to enforce it as part of the Swaach Bharat Abhiyan, or Clean India Mission, which was recently extended to 2022. However, implementation of EPR within each Indian state has been inconsistent to date and the resulting uncertainty appears to be delaying investment. The Government of India (GoI) is expected to issue a policy governing producer responsibility organizations (PROs) in the plastics space – a potential investment category present in other regions – early in 2019. Elsewhere, a decree from the Ministry of Environment in Indonesia implementing EPR is reported to be imminent.

At the national government level, the Southeast Asian nations have expressed an interest in WtE as at least a partial solution to their SWM problems.⁵ However, such investments often depend on tipping fees and/or feed-in-tariffs for their economic viability, and may raise concerns about their environmental and health impacts, particularly in areas where relevant regulations, or their enforcement, is lacking.



Larger investment opportunities downstream in the plastic value chain, with smaller early stage opportunities upstream

While the SSEA countries have investment regimes that are generally welcoming of foreign investment in the SWM and recycling space, the avenues for doing so can vary according to where investment is targeted in the plastic value chain. Further, intangible barriers, such as the need to notify and/or seek licenses from multiple government bodies can slow the investment process and present opportunities for graft.

In the absence of foreign institutional participation, much of the private capital invested in the SWM and recycling sector in the past decade has come from local sources. In the processing segment of the plastic value chain, investment has generally been made by individuals or families in businesses they own and operate. In contrast, in the collection and sorting segment, much of the local funding has come from impact investment funds or High Net Worth Individuals, with generally modest ticket sizes – less than US\$2.5 million – directed to early stage ventures.

Circulate Capital's review of investment opportunities in SSEA countries early in 2018 revealed a modest investment pipeline, with opportunities divided into three broad categories:

- Medium-to-large project financings, particularly of WtE projects and associated activities often with some credit exposure to a public sector entity, with ticket sizes of US\$30+ million and lead times of about two years;
- Small-to-medium project financings, notably for plastic processing expansion or greenfield developments, each with US\$10+ million ticket sizes and lead times of about one to two years; and
- Early stage investments, generally, but not exclusively, in the form of equity or quasi-equity, with ticket sizes ranging from US\$250,000 to US\$10 million, subdivided into businesses requiring financing of:
 - less than US\$1 million that tend to be concentrated in the upstream collection and sorting segment of the plastic value chain, often requiring ancillary technical assistance that is likely to be the preserve of certain impact investors that incubate investment and development funds from bilateral development agencies; and
 - US\$5+ million that are poised for growth and able to accelerate more rapidly.

National Sword has disrupted waste flows and spurred investment in Southeast Asia

China's enforcement of its National Sword policy is the dominant factor driving investment in the plastic value chain in Southeast Asia. The essential closing of the Chinese market for plastic waste has resulted in stockpiled recyclables and diversion to landfills in G7 countries and dramatically increased waste flows from them into Southeast Asia. It has also redirected plastic waste flows from Southeast Asian countries that were formerly destined for China.⁶ As a consequence, both domestic Southeast Asian and Chinese companies have been investing in expanded recycling processing capacity in the region. And, Southeast Asian governments have taken policy decisions to address these changes in export patterns. For example, both Thailand and Malaysia recently announced bans on foreign plastic scrap imports by 2021 and Vietnam has similarly ceased the issuance of licenses for scrap imports.

Systematic and discrete investment approaches

At Circulate Capital, we believe prevailing dynamics in the SSEA countries suggest that, in the near-term, two investment approaches to remediate ocean plastic leakage will be available:

1. Systematic investment within a specific wasteshed.

Typically determined by population concentrations, wastesheds essentially define geographic areas where it is possible to capture economic value from any relevant waste stream given transportation costs. Wastesheds will likely require targeted investment in each segment of the plastic value chain, and potential follow-on investment. For example, because the informal and formal infrastructure for collecting polyethylene terephthalate (PET) for recycling is relatively efficient in the SSEA countries, investment in recycled polyethylene terephthalate (rPET) facilities and their supply chains offers a strong and tangible foundation to build a more integrated waste management system that can expand to capture value from other materials. Collaboration with other investors, or projects, active in additional segments of the plastic value chain and/or focused on other types of waste (e.g., metals, fiber and organics), offers an opportunity for the development of a more efficient, fully integrated and economically sustainable system. Mobilization of other stakeholders (e.g., local governments and civil society organizations) to support and sustain the creation of a holistic, enabling framework will be critical to that goal.

2. Investment that is responsive to discrete opportunities.

While investments in discrete, or individual, projects along the plastic value chain may not lead directly to the development of an integrated waste management system, they can ameliorate plastic leakage in a particular location and deliver a model that could be replicated in other regions. For example, investment in a technology that is able to recycle waste plastic economically on islands where an integrated SWM system is not viable.

Engagement with the informal collector community in SSEA countries is a challenge and opportunity

Informal collectors are the foundation of the informal collection and sorting segments of the plastic value chain, especially for PET as their activities result in high collection rates. Investors in this segment of the value chain will likely have some direct or indirect engagement with this population. Any plan to develop an integrated waste management system will need to be developed in conjunction with this group and offer the opportunity for meaningful social impact, particularly for women, who generally dominate this informal sector.



“Circulate Capital’s Investor Handbook provides a valuable blueprint for how institutional investors can play a more significant role in ending the ocean plastic crisis. We recognize that to solve the ocean plastic crisis it is essential to facilitate greater flows of institutional capital, but until now we have lacked the specific knowledge and insights to identify and evaluate investment opportunities that are ready for deployment today. We believe that this research provides the direction investors need to put more institutional capital to be put to work in service of these goals.”

- Christopher Botsford, Co-Founder and Chief Investment Officer at ADM Capital

Small current pool of co-investors, but diverse and engaged range of stakeholders

The pool of investors active in the SWM and recycling space is currently fairly small. Among the Development Finance Institutions (DFIs), the Multilateral Development Banks (MDBs) have been focused primarily on opportunities that create energy from waste or building landfills. However, a number of the bilateral agencies are expanding their participation either through grants or other de-risking tools like credit guarantees.

Among the SSEA countries, we regard India as having the most developed private sector investor interest, notably among its impact investment funds that have supported the development of SWM companies in specific cities. The recent acquisition of a majority interest in Ramky Enviro Engineers by KKR may signal the beginning of interest in the sector among larger private equity/venture capital (PE/VC) firms, at least in India. However, the modest size of many SWM entities – particularly in the collection segment of the plastic value chain – limits participation by such firms, at least in the near-term. Among the remaining countries, Indonesia’s impact investment community is viewed as the most mature, although lacking a specific focus on SWM. Anecdotally, there appears to be growing interest among Southeast Asian family offices.

In all the SSEA countries, there are vibrant civil society organizations (CSOs) and trade associations that can contribute to the creation of a holistic framework supporting investment in the SWM and recycling space.

Support from national governments is important, but localization is key

National legislation and government policies that are supportive of investment, particularly foreign capital, in the SWM and recycling sector are a prerequisite for attracting the financing necessary for waste management infrastructure investment. And, government commitment to the equitable enforcement of existing SWM laws and regulations is similarly important. Additionally, localization is essential for investment in SSEA countries' SWM and recycling sector to be successful. In order to optimize prospects for successful investment, this means engaging the active support of a variety of stakeholders within the relevant watershed. Local political leaders, for example, should be active champions of waste management, encouraging and facilitating the necessary enabling conditions – such as public education, regulation and funding – for success. Likewise, the CSOs associated with encouraging integrated SWM and recycling within the locality need to be consistently engaged in support of a holistic waste management approach. Where technology is deployed, it must be appropriate for local conditions as well as matched to the existing and future composition of the waste stream to encourage circularity.

For investors, localization militates for a presence on the ground proximate to their investments. Recent research suggests that investors – at least in the impact investment space – with offices in the countries where they invest are much more successful at sourcing and managing investments than those located offshore.⁷ Partnerships with local companies similarly offer access to intelligence and insights not readily available to investors offshore.



“Circulate Capital’s investor handbook offers a valuable blueprint for how investors across the risk/return/impact spectrum can play a bigger role in ending the ocean plastic crisis.”

- Adam Wolfensohn, Co-Managing Partner, Encourage Capital

Innovative approaches to financing are required

Given the billions of dollars required for investment in SWM systems in Asia, the current trajectory of investment is not capable of addressing the magnitude of financing needs. Blended finance vehicles have a role to play, but more innovative structures like social impact bonds (SIBs)/ results-based financing (RBFs), as well as products to tap regional capital markets need to be explored.

Risks – Foreign exchange, politics and recognition of plastic waste's value⁸

Prospective institutional and foreign investors in waste management, recycling sector companies and infrastructure in developing countries are confronted by a wide variety of risks. But in SSEA countries, there are risk considerations of particular note.

Emerging market currencies have the potential to be particularly volatile. Several SSEA countries' currencies have been very weak in the face of a strengthening U.S. dollar for some time, with some at or near all-time lows against the green-back. While hedges are available, the volatility in the currency market means they are often quite expensive. Continuing weakness in SSEA countries' currencies could expose investors to considerable foreign exchange losses.

Political change could also impact the investment environment. Three SSEA countries – India, Indonesia and Thailand – are scheduled to have general elections during the first half of 2019. As always, there is risk that a change in administration could have an adverse impact upon SWM and recycling investments in each country. In India, for example, the removal of the Modi administration could lead to a dilution of the EPR regime that has been a hallmark of the current Bharatiya Janata Party (BJP) government. As past experience in SSEA countries has shown, sudden changes in policy can occur during an administration as well as a consequence of transitions between them.

There is a less manifest risk. Circulate Capital's theory of change is founded on the belief that institutional investment capital can be mobilized through financial structures that mitigate risk and demonstrate that investment in the waste management sector can provide attractive financial returns. Integral to that theory is capturing the economic value of plastic waste. Yet, a recent study on waste management in India noted, in the context of inquiring whether waste management models drawing upon informal waste workers will prevail over centralized, corporate models, "One thing is sure: when waste has a value, a host of powerful interests will be ready to climb on the waste wagon."⁹ Success in demonstrating the value of "waste" plastic may therefore result in a wide array of unforeseen and unintended consequences locally.



"Circulate Capital's Investor Handbook provides a clear assessment of the investment landscape in waste management in South-East Asia and will be a useful tool for institutional investors who are looking to potentially play a bigger role in ending the ocean plastic crisis."

- Frederic Michel, Sky Group Director of Impact and Ocean Ventures

Glossary

ADB	Asia Development Bank
AuM	Assets under Management
BJP	Bharatiya Janata Party
BKPM	Badan Koordinasi Penanaman Modal (Indonesian Investment Coordinating Board)
Blended Finance	Strategic use of development or impact-led financing to mobilize additional funds and facilitate investment in the sustainable growth of emerging markets
CPG	Consumer Product Group
CBCP	Central Pollution Control Board
CPSA	China Scrap Plastics Association
CSO	Civil Society Organization
DFAT	Australian Department of Foreign Affairs and Trade
DFI	Development Finance Institution
Dry waste	Recyclable and non-recyclable materials that are not considered wet, including bottles, cans, clothing, wood, plastics, glass, metals and paper
EPR	Extended Producer Responsibility
GoI	Government of India
GoRI	Government of Indonesia
GoT	Government of Thailand
GoV	Government of Vietnam
HDPE	High-density polyethylene
HNWI	High Net Worth Individual
IDR	Indonesian rupiah
Impact Investment	Investments made into companies, organizations, and funds with the intention to generate social and environmental impact alongside a financial return
INR	Indian rupees
Kabadiwala	Dealer in scrap or used household objects in India
KBLI	Klasifikasi Baku Lapangan Usaha Indonesia (Indonesian Business Classification Code)
NRI	Non-resident Indian
LDPE	Low-density polyethylene
LMIC	Lower Middle Income Country
MDB	Multilateral Development Bank
MIC	Middle Income Country
MIGA	Multilateral Investment Guarantee Agency
MRF	Materials Recovery Facility
MSW	Municipal Solid Waste
MT	Metric tons

Glossary (cont'd)

OECD	Organisation of Economic Co-operation and Development
OPIC	Overseas Private Investment Corporation
Ocean plastics	Mismanaged plastics generated by populations living within 50 kms of a coast that can potentially enter the ocean as plastic debris
PE	Private Equity
PET	Polyethylene terephthalate
PLN	Perusahaan Listrik Negara (Indonesian State Electricity Company)
PP	Polypropylene
PPA	Power Purchasing Agreement
PPP	Public-Private Partnership
PRO	Producer Responsibility Organization
RBI	Reserve Bank of India
RDF	Refuse Derived Fuel
RMB	Chinese renminbi
rPET	Recycled polyethylene terephthalate
SEBI	Securities and Exchange Board of India
SPCB	State Pollution Control Board
SSEA countries	India, Indonesia, the Philippines, Thailand, and Vietnam
SWM	Solid Waste Management
Swachh Bharat Abhiyan	Clean India Mission, a nationwide cleanliness drive and signature policy of the BJP in India
THB	Thai baht
tpa	Tonnes per annum
tpd	Tonnes per day
TPS	Transfer point for MSW in Indonesia
TPS 3R	Transfer point for MSW with associated recycling activity in Indonesia
UMIC	Upper Middle Income Country
USAID	United States Agency for International Development
USD or US\$	US dollars
VC	Venture Capital
Wasteshed	Geographic region within which waste streams are collected, aggregated and sold, resulting in their flow towards one or more concentrations of processors and/or end markets
Wet Waste	Organic items like food, soiled food wrappers, hygiene products, garden waste, tissues and paper towels, and any other item that would contaminate dry waste
WtE	Waste-to-Energy
WtF	Waste-to-Fuel



Introduction



A Global Crisis

Globally, there is a growing societal awareness of the crisis that the leakage of ocean plastics presents. Only a year ago, Michael Gove, the secretary of state for environment in the United Kingdom, declared himself “haunted” by images of whales and turtles affected by ocean plastics in the BBC’s Blue Planet 2 television series, noting that “the imperative to do more to tackle plastics in our oceans is clear.”¹⁰ Similarly, in March 2018, members of the YouTube generation were simultaneously fascinated and appalled by a video of a diver swimming through a deluge of plastic waste 20 kilometers from the island of Bali, Indonesia.¹¹

A crisis our world’s ocean plastic pollution certainly is. An estimated 150 million metric tons of plastics have already entered the world’s ocean, with long-term effects on the environment, including impacts on aquatic and terrestrial human life, largely unknown.¹² Each year, an additional 8 million metric tons of plastics from land-based sources enter the ocean, much of it a consequence of under-funding – both from an operational and infrastructure investment perspective – of waste management services in fast-growing countries that are the largest contributors to ocean plastic leakage.¹³ But, with economic growth and increased consumption with its associated waste, urban solid waste is anticipated to increase by 70 percent from 2.01 billion tons in 2016 to 3.40 billion tons in 2050. Developing countries will face the greatest challenges, including adverse public health impacts of uncollected waste, such as gastrointestinal and respiratory infections, and structural challenges like blocked drains, which aggravate floods and spread infectious disease.¹⁴

Research published in 2015 suggested that coordinated action by the five countries that contribute most to mismanaged plastics – China, Indonesia, the Philippines, Thailand, and Vietnam – could “reduce global plastic-waste leakage by approximately 45 percent over the next 10 years.”¹⁵ So far, unfortunately, such collaboration has not materialized.

Moreover, while consumption in these countries has been growing exponentially, investment in waste management infrastructure has not. In a recent report, Asian Development Bank warned that the Asia region needs to invest US\$26 trillion between 2016 and 2030 to resolve a serious shortfall of investment in overall infrastructure that threatens its economic growth, ability to eradicate poverty and response to climate change.¹⁶ A doubling in annual expenditure to US\$1.7 trillion will be required to address the existing infrastructure “investment gap” that is estimated at 2.4 percent of projected GDP for the 5-year period from 2016 to 2020. The estimated investment required in the water and sanitation sector totals US\$800 billion over that period.

Currently, the public sector funds about 90 percent of infrastructure development in Asia. It is clear, however, that neither governments nor DFIs can fund the investment gap identified by Asia Development Bank (ADB) without the provision of capital from the private sector.¹⁷



The Top 100 Asian institutional investors allocate only US\$65 billion, or 0.3 percent of their assets under management (AUM), to the infrastructure sector. A shift in asset allocation by them of 1-2 percent of their AUM from other asset classes into infrastructure, spread over five years, would see an average annual flow of between US\$40 and US\$80 billion and represent “a substantial addition to infrastructure financing.”¹⁸ But, without government or DFI support, some 55-65 percent of infrastructure projects in Asia are estimated to be “fundamentally not bankable.”¹⁹

Factors contributing to the lack of bankability include:

- Unfavorable legal and regulatory frameworks,
- Political instability and uncertainty,
- Capital markets with low liquidity and currency volatility,
- Illiquid nature of infrastructure assets,
- Complexity of the asset class – from both governance and operational standpoints,
- Poorly-structured projects without sufficient economic or technical viability, and
- Lack of data on prior infrastructure projects for benchmarking.²⁰

These factors, and their associated risks, complicate significant investment in many Asian economies’ waste management systems. As a recent consultation paper on blended finance noted, “[I]t is hard to get private investors to come in and play at scale today in many developing countries. There are too many risks of different types, including feedstock risk, off-take risk, regulatory risk, land-access risk and indeed, technology risk – since some of the waste conversion technologies are new.”²¹

A Regional (Partial) Solution

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Ocean Conservancy has been in the vanguard of efforts to address the issue of ocean plastic. In 2015, together with the McKinsey Center for Business and Environment, it published *Stemming the Tide*, a report that identified the sources and means by which plastic debris leaks to the ocean, articulated solutions to reduce leakage and specified the essential components of a concerted program for global action to address leakage.²² This was followed in 2017 by Ocean Conservancy’s report *The Next Wave*, which outlined where the private sector should invest in the plastic value chain to support waste management and resource efficiency goals toward keeping plastic out of the ocean.²³



In October 2017, Ocean Conservancy and its partners, including Trash Free Seas Alliance®, Closed Loop Partners, World Plastics Council and American Chemistry Council, announced the Closed Loop Ocean initiative.²⁴ The initiative was devised to pilot the formation of a new funding mechanism to prevent plastic waste from leaking into the ocean through investment in the collection, sorting and processing/end markets segments of the plastic value chain in Asia. Recognizing the investment gap caused by the absence of institutional investment in the waste management infrastructure, the initiative also aimed to catalyze public and private sector capital and enhance project bankability.

The plastic value chain commences with the manufacture of plastics in various forms that are fabricated and used as products and packaging by consumers. In our linear systems after use – or, preferably, reuse – the plastic products and packaging become plastic waste that needs to be managed. In order to transform this linear system into a more circular economy, interventions varying in scale and implementation period are required along all segments of the value chain.²⁵ The Closed Loop Ocean initiative (and hence this handbook) focused on the potential for funding interventions after plastic becomes waste to reduce mismanagement and encourage its capture before it leaks to the ocean (Figure 1). It did so in the belief that facilitating near-term investments in waste management infrastructure of countries contributing most to plastic mismanagement will drive the most immediate and meaningful reduction in leakage to the ocean and build a foundation for a truly circular economy.²⁶

Figure 1: Segments of the Plastic Value Chain Assessed



The initiative undertook a landscape assessment to determine the viability of a waste management infrastructure funding mechanism for SSEA countries. The assessment focused on the potential for catalytic investment in India, Indonesia, the Philippines, Thailand and Vietnam due to the countries' contribution of mismanaged plastic waste leaking into the ocean.²⁷ It also validated the need for a funding mechanism that can attract private capital to the waste management and recycling sector in Asia, while mitigating some of the associated risk.



Circulate Capital, a new investment management firm dedicated to incubating and financing companies and infrastructure that remediate ocean plastic leakage, was launched in July 2018 in order to address that need. In October 2018, Circulate Capital announced we had received more than US\$100 million in commitments toward the creation of funding structures that blend concessionary and philanthropic monies with market rate private capital to invest in waste management and recycling companies and infrastructure in South and Southeast Asia.

Circulate Capital is designed to be a catalyst to help attract the billions of dollars required for investment in Asian SWM systems and infrastructure. The issue of mismanaged plastic in the region extends well beyond the countries included in the landscape assessment. Countries as diverse as China, Jamaica, Kenya and Palau are all grappling with how to address the issue of plastic waste and leakage into the environment. Tackling the waste management sector's perceived lack of bankability, attracting private capital and proving the availability of acceptable risk-adjusted returns, should spur the development of additional funding models that cumulatively crowd-in institutional investment in all regions.

Investment Handbook

This handbook is informed by the landscape assessment undertaken to determine the viability of a waste management infrastructure funding mechanism for SSEA countries and seeks to build upon the foundational information provided by Ocean Conservancy and others to develop a framework to channel investment into the waste management and recycling space.²⁸ It provides the most substantial and practical information for prospective investors through a broad overview of the major trends and investment considerations of the SSEA countries included in the landscape assessment, alongside more detailed appraisals of India and Indonesia. We publish this handbook in the spirit of transparency and collaboration to encourage the participation of other investors in the SWM and recycling sector.

The handbook does not rank investment opportunities according to estimated impact on ocean plastic remediation. Instead, it highlights a selection of opportunities available in each segment of the plastic value chain. In keeping with Circulate Capital's commitment to "open-source" our impact, we will publish our environmental and social impact model and provide regular updates on the impact of our investment portfolio in those areas. Our metrics include not only the diversion of ocean-bound plastic from landfill and the environment, but also broader environmental, social and governance issues, such as climate change and human rights.



SSEA Countries Overview



Introduction

SSEA countries comprise a varied group of nations, demonstrated by their economic and social development indicators set out in Figures 2 and 3. All five countries fall within the World Bank's Middle Income Country category. While these countries have very different development needs, they all have unfinished development agendas and, as the World Bank notes, "risk being 'trapped' in middle income status if they do not further their own economic, social and structural transformation."²⁹ A critical part of that unfinished development agenda is establishing waste management systems that address the increased consumption accompanying their economic growth, which results in their significant contribution to ocean plastics.

Figure 2: Economic Development Factors

Country	GDP (PPP) – 2017 (USD m)	FDI Net Inflow – 2017 (USD m)	Ease of Doing Business Ranking – 2018 (out of 190)	Global Competitiveness Index Rank – 2017/2018 (out of 137)
India	9,448,658.81	39,978	100	40
Indonesia	3,242,768.58	22,078	72	36
Philippines	875,311.11	10,049	113	56
Thailand	1,233,736.13	9,100	26	32
Vietnam	647,368.43	14,100	68	55

Source: GIIN/Intellicap and Circulate Capital

Figure 3: Social Development Indicators

Country	Population (000s)	GDP (PPP) per capita	GINI Coefficient	Human Development Index Rank	SDG Index Rank	Global Gender Gap Rank
India	1,342,512	7,056	35.1	130	112	87
Indonesia	263,991	12,284	39.0	116	99	88
Philippines	104,918	8,343	40.1	113	85	7
Thailand	69,037	17,871	44.5	83	59	71
Vietnam	95,540	6,775	37.6	116	57	65

Source: GIIN/Intellicap and Circulate Capital. All figures for 2017 except SDG (2018) and Gender Gap (2016)



SWM Legal and Regulatory Framework

All of the SSEA countries have national-level legislation mandating the collection and management of household waste. In the Philippines, Asian SWM sector participants point to the Ecological Solid Waste Management Act of 2000 (or RA9003 as it is often referred to) as an early and model example of systematic and comprehensive legislation addressing SWM.

A number of SSEA countries have published multi-year, national-level strategies with specific waste management targets. In 2009, for example, Government of Vietnam (GoV) released its National Strategy on Integrated Management of Solid Waste to 2025, with a Vision to 2050. This incorporates a number of circular economy concepts and fairly ambitious targets. By 2020, its goal is to collect and treat up to 90 percent of solid waste in urban areas, of which 85 percent is targeted to be recycled or reused to produce energy or organic fertilizer. By 2050, it foresees that all solid waste will be collected, reused, recycled and thoroughly treated with advanced and environmentally friendly technologies appropriate to conditions in each local area. The strategy was revised in May 2018. It now includes, among other targets, the replacement of non-biodegradable plastic bags used in commercial locations and supermarkets with environmentally friendly plastic bags, and the collection and treatment of 80 percent of domestic solid waste generated in rural areas. These targets are to be achieved by 2025.

Similarly, in October 2018, GoV adopted the Strategy for Sustainable Development of the Marine Economy of Vietnam toward 2030, with a Vision to 2045. Among its goals, the strategy seeks to prevent and considerably control and reduce ocean plastic pollution, and to ensure that 100 percent of hazardous waste and solid waste in coastal provinces and cities is collected and treated by 2030.

However, implementation remains a challenge. Market participants note the absence of a clear implementation plan to achieve objectives, and express concerns that SWM administrative and regulatory structures can be complicated, laborious to negotiate and impractical. Similarly, Indonesia's National Marine Debris Action Plan 2017-2026 could benefit from more specificity on how its 70 percent reduction in marine plastic debris by 2025 is to be achieved.

Local Government Fiscal Weakness

National-level legislation and waste management strategies notwithstanding, the provision of SWM services is ultimately — whether de jure or de facto — a local matter. Yet, the relevant local government bodies in SSEA countries are confronted by chronically underfunded SWM budgets either as a result of insufficient central government financial allocations (e.g., as in the Philippines) or a lack of revenue for such services from the relevant populations (e.g., Thailand, but essentially all SSEA countries), or both.³⁰ As the World Bank recently noted, SWM is often the largest single-budget item for many local



governments in low-income countries, comprising about 20 percent of municipal budgets, yet over 90 percent of waste in such countries is still openly dumped or burned.³¹

Local governments' lack of ability to attract credit deters the flow of capital to the SWM and recycling sector, especially in the form of public-private partnerships. This is further exacerbated by uneven enforcement of SWM laws and regulations, including municipal regulations mandating source separation by householders, and prohibitions on illegal dumping and burning of waste by households. These shortcomings are often accompanied by transparency and governance challenges (e.g., demands for payment made by self-appointed guardians of collection centers in Indonesia for householders to drop off household waste at government-constructed locations).³²

One consequence of local government fiscal weakness is the flow of capital to investments in private sector ventures. The mixing of wet and dry household waste, often in single-use plastic bags, for example, represents an additional cost for collection and sorting entities that adversely impacts already small margins. As M.S. Goutham Reddy, the CEO of Ramky Enviro Engineers, observed in 2016 of the Solid Waste Management Rules in India, "The law says that source separation is mandatory. Which country in the world has achieved it well? . . . Sixteen years after the law is framed, we don't have one good example" of a local authority meeting all the rules' stipulations.³³ Consequently, capital flows to entities that can access already separated waste streams, where exposure to local government lack of creditworthiness can be avoided, and security of feedstock – in terms of reliability of supply and consistency in its composition – is better assured.³⁴

Extended Producer Responsibility

EPR, according to the OECD's definition, is "a policy approach under which producers are given a significant responsibility – financial and/or physical – for the treatment or disposal of post-consumer products."³⁵ Of the SSEA countries, only India has implemented an EPR-based SWM scheme focused on plastic waste, and is enforcing it at both the national- and state-levels.

As the World Bank notes, EPR is

"[a] unique form of private sector participation [in which] the cost for the final recycling or disposal of materials is borne by the producer of the good. Producers may pay the municipality directly for the cost of collection and disposal or develop a system for citizens to return the product. In either case, producers will often price the cost of disposal into the product so that consumers ultimately bear the disposal cost. Therefore, both producers and consumers are financially and logistically responsible for their resource usage."³⁶



The implementation of India's Plastic Waste Management Rules in 2016 has had a measurable impact upon the waste plastics market. According to aggregators of plastic waste, there has been some expansion in the variety of plastics that informal collectors are willing to collect – beyond PET into HDPE, Tetra Pak and even laminates – as price increases (initially taking the form of “subsidies” offered by producers and brand owners to incentivize informal collectors to recover particular plastic polymers) have become regarded as an integral cost of doing business in the subcontinent.³⁷ There has been an expansion of entities engaged in assisting producers and brand owners to fulfil their obligations under the Plastic Waste Management Rules, identifying as PROs, drawing from the PRO concept in the E-Waste Regulations and analogous organizations in Europe.³⁸

Several participants in the SWM and recycling sector in India have indicated that with the EPR regime's implementation and the accompanying greater value attributed to associated plastic waste streams, the sector is now at a “tipping point.” They anticipate a future consolidation of the number of private entities involved in the collection and treatment of waste streams, as well as greater efficiency in their aggregation with the introduction of more professional management techniques. The recent acquisition by a global PE firm of one of India's largest environmental management services would seem to support that view and predict an increased flow of capital to the sector.³⁹

Waste-to-Energy

Most notably in Thailand and Indonesia, there have been recent legislative and/or regulatory changes that reflect the growing focus of SSEA governments on waste-to-energy (WtE) projects. In Thailand, the conversion of waste into energy has been incorporated into the National Solid and Hazardous Waste Management Roadmap prepared by the Ministry of Natural Resources and Environment.⁴⁰ And promulgation of regulations pursuant to the Cleanliness and Tidiness Act have been designed to speed up the approval process for WtE projects, perhaps reflecting the country's desire to preserve its energy independence as offshore gas deposits mature.

Such developments have not gone unchallenged, however. In Indonesia, a series of CSOs sought judicial review of a 2016 Presidential Regulation aimed to encourage WtE projects, resulting in a court-imposed delay of over a year. A revised Presidential Regulation intends to provide a more comprehensive framework for WtE project development. This reflects the Government of Indonesia's (GoRI's) commitment to converting plastic waste into energy captured in its National Marine Debris Action Plan, 2017-2025.



Investment Landscape

Investment Restrictions

SSEA countries are generally welcoming of foreign investment in the SWM and recycling sectors. In fact, the trend among these governments is to remove legislative barriers to investment. For example, in order to encourage growth capital to enter specific sectors, India's Foreign Venture Capital Investor route allows investment in convertible instruments issued by an investee that are precluded by regulations applying to other investment routes. It also frees such investors from Reserve Bank of India's (RBI) prescriptions on entry and exit pricing that apply under other routes. Similarly, as noted above, several SSEA countries have passed legislation and promulgated regulations to encourage foreign investment in WtE projects.

Informal barriers to investment do exist, often taking the form of administrative delays in connection with approval processes. Such instances may or may not be accompanied by instances of corruption. The investment process is not standardized, which increases complexity and transaction costs. In India, for example, the timeline and channel through which a foreign entity can invest can vary according to where in the plastic value chain an investment will be made.

View on Opportunities

Investment Activity

Appendix A shows equity funding activity in the SWM sector in India and the ASEAN region for the period 2008-18. While the data is incomplete, it suggests that in the SSEA countries' SWM and recycling sector:

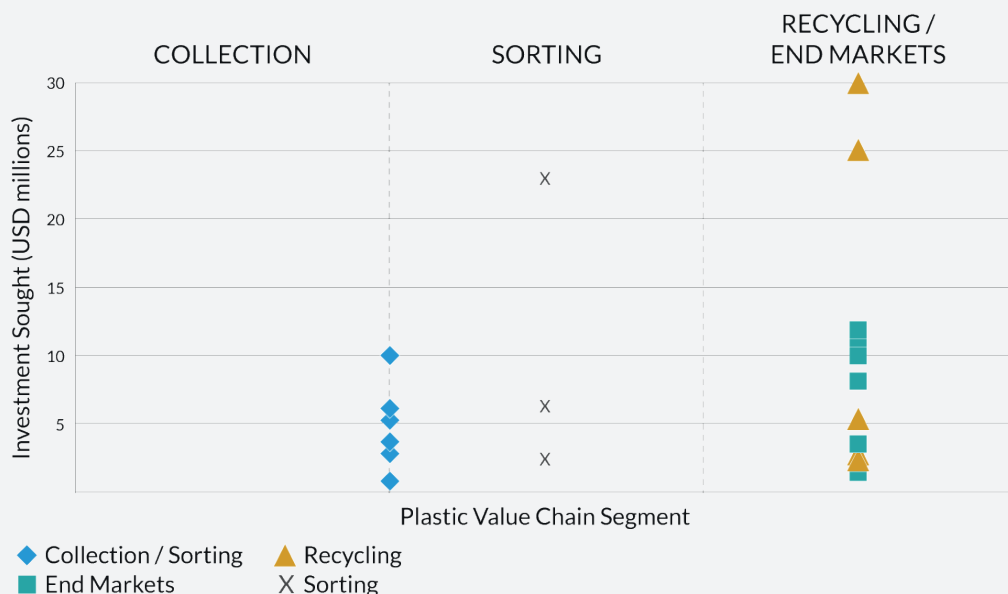
- Private investment is more developed in India,
- The majority of investment is directed to early stage ventures,
- Ticket sizes are generally less than US\$2.5 million, and
- Several investors have made follow-on investments.

SSEA Investment Landscape Overview

Figure 4 comprises a sample of investment opportunities identified during the SSEA landscape assessment undertaken early in 2018.



Figure 4: SSEA Countries - Sample Investment Opportunities



Circulate Capital believes the investment opportunities can be divided into three broad categories:

- Medium to large project financings with some credit exposure to a public sector entity (e.g., a public utility), with ticket sizes of US\$30+ million and lead times of about 2 years;
- Small-to-medium project financings, notably for plastic processing expansion or greenfield developments, each with US\$10+ million ticket sizes and lead times of about 1-2 years; and
- Early stage investments, generally, but not exclusively, in the form of equity or quasi-equity, with ticket sizes ranging from US\$250,000 to US\$10 million.

Within this last category, there is a clear distinction between businesses requiring financing of less than US\$1 million and businesses requiring investment of US\$5+ million that are poised for growth. There are relatively few of the latter category. Overall, the investment pipeline is not especially robust, particularly in the collecting and sorting segments of the plastic value chain.

A common characteristic of the smaller, early stage companies – which tend to be concentrated in the collection and sorting segments of the plastic value chain – is the need for ancillary technical assistance in addition to access to finance.



That assistance must necessarily address these entities' constraints in management skills and capacities, the absence of strong networks in the SWM and recycling sector, and a lack of familiarity with and/or access to technologies that can enhance efficiency.

The fixed cost of conducting due diligence in emerging markets, the small ticket sizes sought by early stage opportunities and the need for concomitant non-monetary investment, often precludes the interest of foreign impact investment funds. It also places them outside the purview of traditional PE/VC funds. The need to incubate these companies is better aligned with the patient and predominantly grant-based capital that is provided – albeit in relatively small amounts – along with technical assistance by DFIs, particularly bilateral agencies.

Indeed, a common characteristic of many of these smaller enterprises is their origin as non-profit organizations (NGOs) or similar charitable organizations (e.g., yayasans in Indonesia), in which private capital cannot be invested. One purpose of incubating these entities is to transform or transfer the underlying “business model” into a corporate form in which private capital, especially foreign, can invest. A secondary goal is scaling entities so they can effectively deploy investor capital.

An analogous opportunity is the availability of SWM infrastructure assets around which investable businesses can be built, such as a long-term lease on a collection/sorting center where a Material Recycling Facility (MRF) might be constructed. Assets may not currently be held within an investable entity and may require the provision of additional management capacity to be ready for investment.

China's National Sword Policy

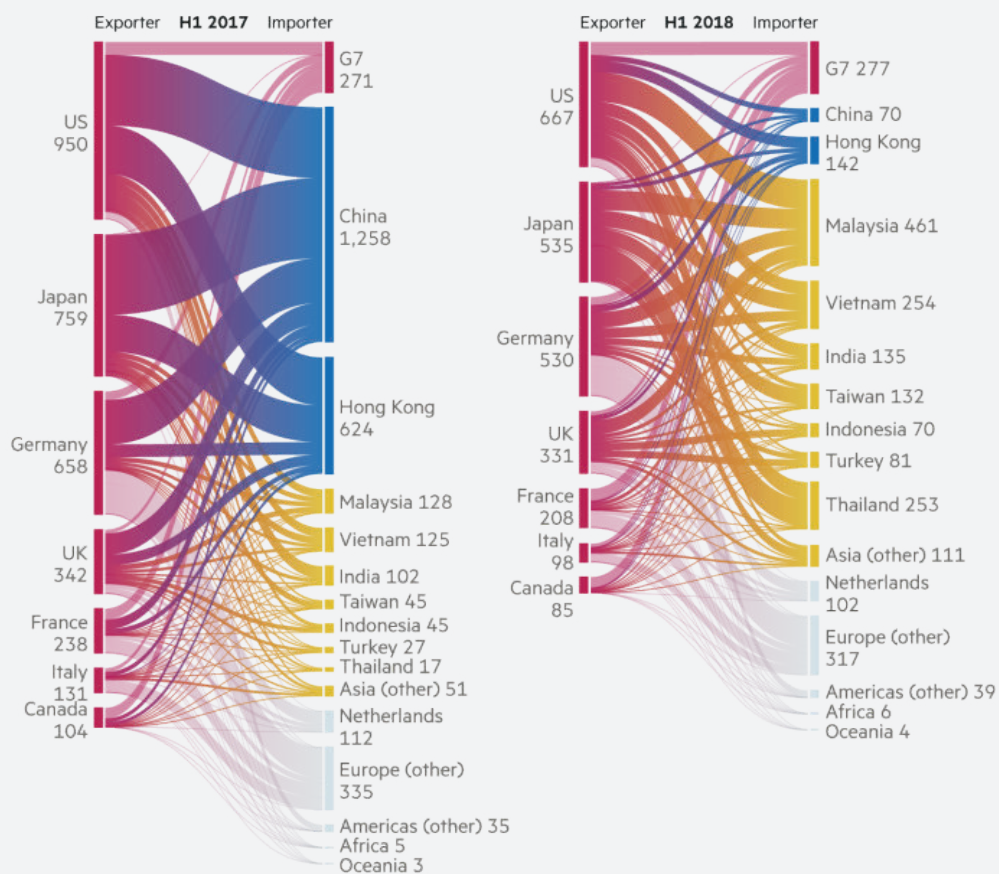
At the beginning of 2018, China implemented its National Sword policy that banned 24 types of solid waste, including a variety of plastics and unsorted mixed papers. It also established new contamination standards, which are so stringent they are tantamount to a ban on certain waste types. The imposition of the new policy has disrupted many of the waste streams in SSEA countries that were structured for export to China, as well as redirected flows to them from other countries affected by the ban. While some circumvention of the policy is occurring, the accumulation of streams by former exporters has highlighted opportunities for using plastic waste streams in SSEA countries' domestic markets.

In the Philippines, for example, many beverage bottlers rely on the import of rPET pellets from China for their bottle manufacturing needs, having been unable to source quality rPET domestically. With the build-up of plastics historically bound for China, at least one locally listed company has expressed an interest in manufacturing rPET pellets for the Philippine market.



Similarly, in Indonesia, a redirection of domestic waste flows previously exported to China into the East and West Java markets has prompted expansion plans by a number of recyclers, especially of PET, but also of high-density polyethylene (HDPE), low-density polyethylene (LDPE) and other higher value plastics.

Figure 5: Exports of Plastic waste, pairings and scrap from G7 countries ('000 tonnes) – 1H 2017 vs. 1H 2018



Source: Financial Times

As the Financial Times noted, “Between the first half of 2017 and the first half of 2018, Vietnam saw its imports of plastic scrap double, while shipments to Indonesia rose 56 percent . . . , [although] [t]he country that has seen the biggest percentage increase of all is Thailand, where imports surged 1,370 percent.”⁴¹

The resulting ripeness for investment in the Southeast Asian plastics recycling market was underscored by a 2018 regional tour, which included Malaysia, the Philippines, Thailand and Vietnam, by the China Scrap Plastics Association



seeking opportunities to invest in processing in countries that previously exported their recyclables to China.⁴² Without providing a time-frame, CSPA has stated that Chinese corporate investment in Southeast Asian waste supply chains totals US\$1.54 billion (or RMB10 billion).⁴³

However, in response to growing public discontent about the environmental impact of plastic imports, Government of Thailand (GoT) stated in June 2018 that it will stop all imports of foreign plastic scrap by 2021. Similarly, in July 2018, GoV announced it would stop issuing licenses for imports of paper, plastic, metal and other waste in order to “keep the country from becoming a dumping site.”⁴⁴ India has also previously banned plastic imports, while in Indonesia, which began more rigorous inspections of imports earlier in 2018, some domestic recyclers are reportedly suggesting that any increase in imports could hamper local collection efforts.

Sources of Co-investment

Development Finance Institutions (DFIs)

Among DFIs, the World Bank, notably, does not invest directly in the private sector. Instead, it provides loans to its client countries in furtherance of specific government policies. Other multilateral DFIs, ADB and the World Bank’s private sector arm, International Finance Corporation, for example, can finance companies either by way of loans, equity investment or the provision of structured products (e.g., loan guarantees and first loss facilities). Over the last decade, DFIs’ impact investment activity in Southeast Asia has tended to focus on the energy and financial services sectors, and not waste management infrastructure.⁴⁵

Of the bilateral DFIs and aid agencies, Australian Department of Foreign Affairs and Trade (DFAT) has been particularly forward thinking in a number of areas, especially gender-lens investing. In 2018, it awarded a US\$1 million grant to SecondMuse, a portion of which will go to fund the establishment of an ocean plastics incubator in Surabaya. USAID is also seeking to be more active in the SWM space, notably through its Development Credit Authority loan guarantee facility. And, with the recent passage of the BUILD Act in the U.S. Senate, the prospect of a new agency – the International Development Finance Corporation – incorporating Overseas Private Investment Corporation (OPIC) and some of USAID’s functions, may herald more equity investment rather than just debt.

Of the SSEA countries, the Philippines has a unique domestic development finance institution, Development Bank of the Philippines, that has the capacity to provide cost-effective debt capital to credible projects.



Domestic Private Capital

Among the SSEA Countries, India has the most fully developed financial sector with a range of funders willing to invest in early stage ventures in the collection and sorting segments of the plastic value chain. Anecdotal evidence suggests, however, that investment capital for growth is scarcer.

Of the remaining SSEA countries, Indonesia's impact investing ecosystem has been identified as the most mature in Southeast Asia, with a range of local, regional and global players.⁴⁶ With the exception of Vietnam, these countries also have active family offices, many of which are associated with family controlled conglomerates. While none has a specific focus on the SWM and recycling sector, there does appear to be some interest in the sector. For example, a regional WtE development company reports interest from Thai family offices in funding the construction of a MRF connected with a local project.

SWM Stakeholders

In each of the SSEA countries, there are a range of stakeholders concerned with the mismanagement of plastic waste. Any prospective investor would be well advised to engage these actors to inform and support its strategy for investing in an integrated waste management system, or at any stage of the plastic value chain.

Informal Collectors

Each SSEA country has an informal sector of collectors and recyclers, comprised of individuals often referred to as waste or rag pickers. Prospective investors in the collection segment of the plastic value chain will likely need to interact with this sector. Many of these informal collectors are poorly educated women, who in some instances have formed cooperatives or similar such groupings. Examples include the SWaCH cooperative in Pune, India and the women's cooperatives and syndicates in Ho Chi Minh City, Vietnam. As The Next Wave noted, "any proposed integrated waste system strategy should be designed [in] meaningful consultation with waste pickers and the non-profit institutions that support them to ensure that their interests are protected and the project implementation is holistic."⁴⁷ For investors seeking to affect social impact and generate a financial return, particularly those with a gender-lens mandate, engagement with this informal sector appears to offer considerable opportunity for social and economic enhancement of its participants.



Civil Society Organizations (CSOs)

Despite their varied forms of government, all of the SSEA countries possess vibrant CSOs that seek to remediate the leakage of ocean plastic and encourage the development of improved SWM systems, and which are concerned with related issues such as improving public health and sanitation, reducing GHG emissions from waste and supporting vulnerable populations.

Local Consumer Packaged Goods companies (CPGs)

While multinational CPGs have made significant commitments to reducing their use of plastics, and/or increasing their use of recycled materials, local CPGs – whose products may often account for a majority of waste materials – in the SSEA countries have not yet substantively engaged on the issue. However, there are indications this is beginning to change, particularly in India with the ruling BJP party's consistent focus on its Swaach Bharat, or Clean India, policy.

Also, some locally listed companies, mindful perhaps of potential pressure from overseas shareholders, have begun to focus on the issues of plastic recycling and encourage circular economy business models. For example, ThaiBev, the leading beverage company in Southeast Asia and the largest in Thailand, retrieves an estimated 75 percent of the glass bottles used in its production and would similarly like to increase its use of recycled plastic. However, Thai regulations proscribe the use of recycled plastic, even when it is food grade, if that material will come in contact with food and beverages, underscoring the need for enabling environmental improvements in markets to increase investment.

Investment Approaches

Circulate Capital believes the characteristics of the SWM and recycling sector in SSEA countries suggest that two near-term investment approaches should be embraced to remediate ocean plastic leakage: systematic investment along the plastic value chain within a specific watershed; and investment that is responsive to discrete, or individual, opportunities.

Systemic Investment

We believe a concentrated focus on developing an integrated waste management system within a specific watershed will require targeted investment, and possibly follow-on investments, within each segment of the plastic value chain over several years.



As formal and informal systems for collecting PET for recycling are relatively efficient in each of the SSEA countries, investment in rPET facilities and their supply chains may offer a foundation upon which to build a more integrated waste management system. Similarly, collaboration with other investors, or projects, active in additional segments of the plastic value chain and/or focused on other types of waste, provides an opportunity for the development of a more efficient and fully integrated system. Partnership with local companies (beyond investment therein) in the SWM and recycling space is an example.

Additionally, the mobilization of other stakeholders to support and sustain the creation of a holistic enabling framework will be critical. As The Next Wave noted:

“[c]reating value from waste is a complex challenge, but one that could be met in a relatively short time frame through a partnership involving... municipalities, national government agencies, DFIs, local CSOs, and their community partners and private sector players.”⁴⁸

Yet, as a member of the Bangalore Political Action Committee – an NGO founded in 2012 “to convert urban apathy into positive urban engagement” – presciently noted, “Change[s] at a local level require[s] ‘an engaged local leader.’”⁴⁹ Courting the support of the relevant local government is critical, but may come with political risk.

With the prevalence of early-stage ventures in the collection and sorting segment of the plastic value chain in SSEA countries, the presence of an incubator with the ability to scale these businesses can help address the relative paucity of investment opportunities capable of absorbing several million dollars of capital.

Ad Hoc Investment

Discrete investment opportunities are likely to occur within distinct segments of the plastic value chain, especially in the downstream processing and end-market segment where ownership of waste streams is clearer. For example, the efficiency of PET bottle collection in the SSEA countries, combined with increased consumption, supports the expansion of rPET businesses, particularly those focused on yarn and fiber production. On their own, they may not contribute significantly to the development of an integrated system, but may nevertheless mitigate a specific source of mismanaged plastic. Care must also be taken that one-off investments do not inadvertently create bottlenecks elsewhere in the plastic value chain.

An Approach to Wasteshed Investment

A wasteshed is a geographic region where waste streams, including plastics, are collected, aggregated and sold, resulting in their flow toward one or more concentrations of processors and/or end markets.

While the value chain for waste materials within each wasteshed comprises a variety of actors –informal collectors, traders, sorters, aggregators, processors and end-market users – there are also a number of stakeholders connected to streams with an interest in abating leakage and addressing other associated issues. These include:

- Multinational and local CPGs whose products contribute to the waste stream,
- CSOs focused on increasing collection and sorting waste, and local governments with insufficient SWM budgets,
- Trade and other associations that represent participants in the value chain,
- Academic institutions that may have technology and/or market intelligence or data relevant to the sector, and
- Producers of materials that contribute to the stream or take from it as a raw material as well as CSOs focused on public health.

Any investor in the SWM and recycling sector should regard these actors as a source of intelligence during the due diligence process connected with a prospective investment. Further, these actors must be viewed as an invaluable resource with potential to contribute to a holistic framework that supports the development of integrated waste management systems.

In many ways, they are critical to the success of investments, as they often provide services, such as public education on-waste sorting, informal waste collector support and local community organization engagement. As such, a key piece of an overall investment strategy in the region should take into account support for relevant organizations through philanthropic or other funds.

SWM Due Diligence in Emerging Markets

Conducting due diligence in emerging markets can be particularly onerous. In SSEA countries, the following areas are worthy of particular focus in the context of plastic waste-related investments:

Supply of Materials

A large number of participants in the plastic value chain are members of the informal sector, so formal contractual relationships are likely unavailable. Even where a formal entity exists (e.g., an incorporated trader) the ongoing sale of material is often subject to continuing goodwill between the buyer and seller and an acceptable price, rather than a written contractual relationship. Enforcement would be neither timely nor cost effective. Consequently, there are points within the value chain where relatively small price discrepancies in purchase offers can lead to the loss of supply. The roll-out of smartphone-based applications that allow access to prevailing price data mitigates risk, as can goodwill shown by a purchaser. For example, when a recycler in a SSEA country suffered a fire that hit production, rather than risk losing supply while rebuilding its production capacity, the recycler continued to purchase a portion of previous raw material requirements to ensure that supply when the recycler came back on-stream.

Land Ownership

For a number of businesses, particularly in the collection and sorting segments, access to land is a barrier to growth and achieving economies of scale. In India, Indian Pollution Control Association (IPCA) is forced to utilize a multitude of scattered sorting operations because it is unable to secure an affordable site in land scarce East New Delhi. Even where land is available to businesses, investors need to be wary. Validation of title to land can often be a complex process with barriers to ownership by foreign entities.

Ownership of Waste

Prospective investors in the sector should also explore where legal ownership to waste lies and how title is transferred. Waste is broadly regarded as valueless, or even as a financial burden, by the vast majority of SSEA countries' populations. For example, a recent survey recorded that just under 7 percent of households in Jakarta are aware that PET bottles have a residual value and are selling or donating after use.⁵⁰ Yet, when that waste – or, more accurately, commodity – is widely perceived to have value, competing ownership claims to it, perhaps led by local governments, are likely to arise.



Incubation

Stakeholders commonly suggest there are four key components required to accelerate development of private-sector businesses that can contribute to addressing ocean plastic leakage:

- Construction of post-consumer use value chains and waste infrastructure,
- Profitable, high-growth businesses in the value chain,
- Enabling policies and initiatives, and
- Capital, particularly blended finance that can crowd-in market rate seeking private investors.

However, the landscape assessment and other analogous initiatives have consistently identified the absence of investable ventures in the value chain as a significant impediment to the development of integrated waste management systems.

In many instances, the paucity of investable ventures is attributable not only to the small sums sought by those ventures, but also their need for ancillary assistance. These needs include help in developing a formal business model, mentorship from experienced managers in the same sector, and assistance in developing a network among SWM and recycling stakeholders. Addressing these deficiencies requires combination of technical assistance with grant and/or concessionary financing.

While not the preserve of institutional investors, this need for capacity building is fertile ground for certain impact-oriented capital providers and DFIs. And, it is critical to the development of a more robust pipeline of companies that are capable of attracting and deploying capital in sums sufficiently large to mobilize interest and investment from institutional investors.

The Incubator Network by Circulate Capital and SecondMuse

In September 2018, Circulate Capital and SecondMuse announced the launch of The Incubator Network. This is a new initiative designed to accelerate solutions to ocean plastic waste by partnering with existing incubators in the construction of waste management and recycling innovator ecosystems. The partnership's inaugural project is the Ocean Plastic Prevention Accelerator in Surabaya, Indonesia. Supported by grants from DFAT and the U.S. State Department, this project will provide expertise, guidance and other resources to innovative entrepreneurs. The aim is to build their capacity and enhance markets for their products and services to facilitate the establishment of an integrated waste management and recycling infrastructure in the Surabaya watershed. Other network participants include McKinsey.org, which is organizing efforts in Bali, and WeWork Labs in India.



Alternative Structures

The magnitude of the ocean plastic leakage crisis demands that sources of capital be secured beyond traditional fund-based structures, including impact investment funds, DFI-funded grants and technical assistance. Blended finance has a role to play through de-risking investments. However, recent developments in the capital markets offer the prospect of structuring offerings that may attract a broader range of investors to the waste management space.

Pay-for-Performance

Social impact bonds (SIBs) or results-based financing (RBF) – pay-for-performance contracts – represent a model worthy of exploration. The first SIB was structured so investors received the relevant coupon and repayment of principal from a UK government entity only if criminal re-offense among recently released prisoners declined, thus achieving a desirable social outcome and savings in public expenditure on prison services. As the World Bank recently noted, in the SWM space, “[b]y tying financing to outcomes, such [financing] encourages stakeholders to operate efficiently and change their behavior.”⁵¹ Among the potential outcomes identified to assist SWM stakeholders are increased fee collection; promotion of source separation, waste reduction, and recycling; strengthening of waste collection and transportation; infrastructure design efficiency; and defrayed risk for investors and a resulting increase in investments.

Capital Markets

The February 2018 issuance of US\$95 million in bonds by the Tropical Landscape Finance Facility (TLFF) – a partnership between UN Environment, BNP Paribas, ADM Capital and World Agroforestry Center – to finance a sustainable natural rubber plantation on heavily degraded land in two provinces in Indonesia, offers a model that could be applied to the development of integrated SWM systems in SSEA countries. Where a relevant local government is prepared to levy appropriate fees for the provision of collection services and is committed to enforcing applicable laws and regulations within its locality, TLFF’s combination of a loan and grant fund could encourage growth of companies that support a more efficient plastic value chain and the move toward a circular economy model.

Possible Investment Risks⁵³

Prospective financial investors in waste management and recycling sector companies and infrastructure in developing countries are confronted by a wide variety of risks. These may be economic, regulatory, legal, extra-legal (i.e., corruption and expropriation), or fluctuations in the supply and price of the underlying commodity (e.g., plastics, glass or metals).⁵² In many instances, the risk of delay can have a significant and adverse economic impact on an investment and returns associated with it.



With regard to the SSEA countries, two categories of risk are noteworthy given recent market activity and electoral cycles: foreign exchange risk and political risk.

Foreign Exchange Risk

Figure 6: SSEA Countries Exchange Rate Regimes

Country	Exchange Rate Mechanism	Monetary Policy Framework
India	Floating	Inflation Targeting
Indonesia	Floating	Inflation Targeting
Philippines	Floating	Inflation Targeting
Thailand	Floating	Inflation Targeting
Vietnam	Stabilized Arrangement	Composite

Source: IMF⁵⁴

The majority of SSEA countries have a floating exchange rate, which according to the International Monetary Fund's definition, means that while each country's central bank may intervene directly or indirectly to affect the value of its currency relative to that of various foreign currencies, the rate is largely market determined. Only Vietnam follows a stabilized arrangement, pursuant to which the State Bank of Vietnam manages the exchange rate within a 3 percent band versus the value of the U.S. dollar, with the aim of preventing sharp swings in the value of the Vietnamese dong.

Over the course of 2018, there have been significant declines in the value of several SSEA countries' currencies, the Indonesian rupiah and Indian rupee, in particular. Consequently, prospective investors must thoroughly assess the foreign exchange risk to which they may be exposed. While the type and length of hedge varies, currency hedges to mitigate foreign exchange risk are available for each of the SSEA countries' currencies against the U.S. dollar.⁵⁵

Additionally, some investments may offer an inherent hedge that offsets potential foreign exchange risk, such as foreign currency revenues from sales that are denominated in U.S. dollar or any other base lending currency. These monies can be accrued in an account, over which the lender has some influence, located in well-regulated jurisdiction other than the investee's domicile.



Political Risk

The SSEA countries comprise a broad range of government types: two of the world's largest democracies, with India, a federal parliamentary republic and Indonesia, a presidential republic; the constitutional monarchy of Thailand that has been governed by a military junta since 2014; the presidential republic of the Philippines that is undergoing significant governance challenges; and the communist state of Vietnam. Yet, as Figure 7 illustrates, one of the world's largest insurance and political risk management companies' Country Risk Index, a broad, composite risk measure, essentially brackets them together.

Figure 7: SSEA Countries Risk Indices

Country	Country	Risk Index		
		Operational	Political	Economic
India	63.6	49.3	77.7	69.6
Indonesia	62.9	52.2	72.9	68.1
Philippines	60.9	44.8	63.1	73.8
Thailand	65.3	59.4	70.8	73.1
Vietnam	63.6	52.9	82.5	67.9

Source: Marsh & McLennan⁵⁶

Legend

Stable		Unstable		
80-100	70-79	60-69	50-59	<49

With regard to political risk, however, there are noticeable differences.⁵⁷ Under communist leadership, Vietnam is viewed as the most stable of SSEA countries. Conversely, the Philippines, which does not have a presidential election until 2022, ranks lowest on the Political Risk Index. And, while general elections are scheduled for April and May 2019 in Indonesia and India, respectively, each of these countries scores relatively high with respect to political risk, likely reflecting optimism concerning the broad continuation of current economic policy should either incumbent fail to be re-elected. Thailand, where elections for a transition to civilian rule are scheduled for February 2019, scores similarly.

A description of the types of political risk insurance is beyond the scope of this handbook. However, 'off-the-shelf' and bespoke products are available from various private sector entities. Additionally, certain DFIs offer several types of coverage (e.g., the Multilateral Investment Guarantee Agency and OPIC).



India: Country Overview



Introduction

India generates about 277 million metric tons of municipal solid waste annually. ⁵⁸ Of the estimated 70 percent collected, with the balance being dumped in an urban environment, about 87 percent is subsequently deposited in open dumps.⁵⁹ Informal collectors are integral to the recovery of resources from the waste generated: together with households, the informal collector sector recovers 30-60 percent of waste paper and cardboard, nearly 100 percent of glass bottles and 50-80 percent of plastics.⁶⁰ That informal sector activity contributes to India's relatively high plastic recovery rates in some types of plastic, notably for PET, where the collection rate for bottles is estimated to be at least 70 percent.⁶¹

In 2016, the year in which Gol introduced an EPR regime, the total market for environmental goods and services in India was US\$10 billion and projected to grow at an annual rate of 10 percent.⁶² Today, according to many market observers, the Indian SWM and recycling sector – buttressed by the Modi Government's Swachh Bharat mission – is at a tipping point. Further, the recent acquisition of a majority interest in Ramky Enviro Engineers by KKR, the global PE firm, is seen as a harbinger of greater interest and investment in the sector from local and foreign investors.

SWM Legal and Regulatory Scheme

It was only in 2000, after almost half-a-decade of privately-funded legal action, that Gol acted to create a uniform national framework for waste management through the Municipal Solid Wastes (Management and Handling) Rules, 2000, which are known as the Solid Waste Management Rules and were promulgated by the Ministry of Environment, Forest and Climate Change pursuant to the Environment Protection Act, 1986. ⁶³ The Solid Waste Management Rules apply to “every municipal authority responsible for the collection, segregation, storage, transportation, processing, and disposal of municipal solid wastes.”⁶⁴ They also make such municipal authorities responsible for the development of any infrastructure related to such activities.⁶⁵

In 2016, the Solid Waste Management Rules were expanded beyond municipal authorities to apply to “urban agglomerations, census towns, notified industrial townships, areas under the control of Indian Railways, airports, air bases, ports and harbors, defense establishments, special economic zones, State and Central government organizations, places of pilgrims, religious and historical importance.”

Importantly, the new Solid Waste Management Rules also:

- Mandate segregation at source, imposing upon the generator of waste the duty to separate waste into three streams – wet (i.e., biodegradable), dry (e.g., plastic, paper, metal and wood) and domestic hazardous wastes (e.g., diapers, napkins, empty containers of cleaning agents and mosquito repellents) – and to hand over segregated waste to authorized informal collectors, waste collectors or local bodies.



- Recognize the “primary role played by the informal sector of waste pickers, waste collectors and [the] recycling industry in reducing waste,” and directs state governments and others to develop policies to integrate them into the formal SWM system.
- Impose upon brand owners who sell or market products in non-biodegradable packaging (e.g., plastics, tin and glass), the obligation to put in place a system that collects the packaging waste generated by their activities.

The rules also draw upon the concept of Swachh Bharat, or Clean India, a platform to improve sanitation in India that was launched by Prime Minister Modi in October 2014. They do so by imposing upon bulk waste generators (e.g., government and commercial buildings, schools and other such establishments where waste generation exceeds 100 kilograms per day) the duty to segregate and sort their waste and manage it in partnership with local authorities.

To buttress enforcement of the Solid Waste Management Rules, the Central Pollution Control Board (CPCB) is tasked, among other things, with coordinating with each State Pollution Control Board (SPCB) to implement the rules and ensure local authority adherence.

In the same year, GoI issued the Plastic Waste Management Rules. These regulations introduced an EPR scheme for producers (i.e., manufacturers of items such as plastic bags, packaging and sheets) and brand owners (i.e., companies selling goods under a registered brand label), making them responsible for the “environmentally sound management of the [plastic] product until the end of its life” and requiring their mandatory registration with the relevant SPCB or Pollution Control committee.⁶⁶ Specifically, the regulations required such entities to establish a system for collecting back plastics used in the conduct of their business within six months, to implement that plan within two years, and to have the plan approved by the SPCB in which it operates.⁶⁷

In practice, this has meant that consumer product groups have engaged third parties to source and collect the same sort of plastics used in their products. For example, sellers of bottled water or soft drinks using PET bottles buy back generic PET bottles in relevant states where they transact business, and must do so in order to maintain commercial licenses.

The implementation of the Plastic Waste Management Rules had an impact on prices for plastics as some producers and brand owners provided subsidies to encourage the collection of post-consumer plastics.⁶⁸ However, as the determination of the CPCB and SPCBs to enforce the new rules became apparent – especially in the case of foreign multinational corporations – these price subsidies for collection became regarded as an integral cost of doing business in India.⁶⁹



Investment Landscape

Implementation and enforcement of the EPR regulations has been uneven among the Indian states and municipal authorities. An absence of capital – both human and financial – at the municipal level means that the Solid Waste Management Rules' prescription of segregation at source is also unbalanced. Nonetheless, the Government of Maharashtra is the leader of EPR regulations implementation. In March 2018, for example, the government published new regulations that require PET and PETE bottle manufacturers, producers, sellers and traders to develop a "Buy Back Depository Mechanism" for bottles with a pre-set price printed on their labels. The regulations also require entities to establish collection and recycling units for those bottles.⁷⁰

Following a balance of payment crisis, the government of Prime Minister P. V. Narasimha Rao, assisted by Minister of Finance Manmohan Singh, embarked upon a financial liberalization program in 1991, designed to rid India of the License Raj. In the intervening period, the financial sector has changed considerably, particularly as a consequence of the inflows of capital from overseas through additional routes for foreign investment created by incremental liberalization.

As a consequence, financial sectors that were previously absent, such as PE/VC, now contribute significantly to India's economic development. For example, a McKinsey & Co study in 2015 estimated that over US\$100 billion had been invested in companies by private equity firms in the previous 13 years. While the study found that there were shortcomings to private equity investment, it concluded that it had "played a pivotal role in the development of small and medium-size enterprises and critical industries, spurred job growth, and facilitated the development of strategic capabilities."⁷¹

In contrast with other SSEA countries, which began comprehensive reforms to their financial sectors only after the Asian Financial Crisis in 1997, India possesses a more fully developed range of capital providers for early stage ventures. These entities, which include a number of early-stage impact investors, are buttressed by individual Non-resident Indians, who often act as angel investors to start-ups and early stage companies.

Investment Activity

The range of funders active in India is reflected in the marked difference in size of two transactions that occurred in the SWM sector in 2018.

In June 2018, Aavishkaar – an early-stage venture capital provider – made a US\$6.5m follow-on investment in the Ahmedabad-based waste processing firm NEPRA Resource Management Pvt. Ltd, which operates under the "Let's Recycle" brand. Asha Impact was a co-investor in the round, and the proceeds will be used to fund NEPRA's expansion to three new cities.



In August 2018, private equity investor KKR announced that it acquired a 60 percent interest in Hyderabad-based Ramky Enviro Engineers Ltd (REEL) for US\$530 million. REEL, which had a turnover of US\$260 million in the year to March 2018, operates environment management services, including collection, transport and processing of hazardous, municipal, biomedical and e-waste, as well as recycling of paper, plastic and chemicals. The transaction is the largest ever in the Indian SWM space and marks the first indication of interest in the space by foreign PE/VC firms.

Early stage investment in Indian SWM – NEPRA-Let's Recycle

Around 2012, Aavishkaar, an investor in early stage ventures, targeted waste management in India as a potentially attractive investment sector since there was minimal action being taken to address a nationwide problem. However, in reviewing opportunities, the investor identified two primary hurdles to investment. These were the absence of separation at source by households, despite its being prescribed under the Solid Waste Management Rules; and the poor financial position of municipal authorities, which are tasked with providing waste management services, and corruption in the award and maintenance of local authority SWM contracts.

NEPRA-Let's Recycle, which focuses on dry waste (thus avoiding the need for separation at source) and provides services to the private sector only, offered a business model with no associated local government risk through which Aavishkaar could gain exposure to and experience in the SWM sector.

Aavishkaar adopted an incremental approach, initially investing only US\$400,000 to see whether NEPRA-Let's Recycle could continue to source segregated waste. Additional rounds have allowed the company to migrate from manual to mechanical sorting, and to move from positive operating margins to profitability at the pre-tax level. The latest round of investment in early 2018, which saw Aavishkaar partner with Asha Impact, will allow NEPRA-Let's Recycle to expand its model to three new cities in India.

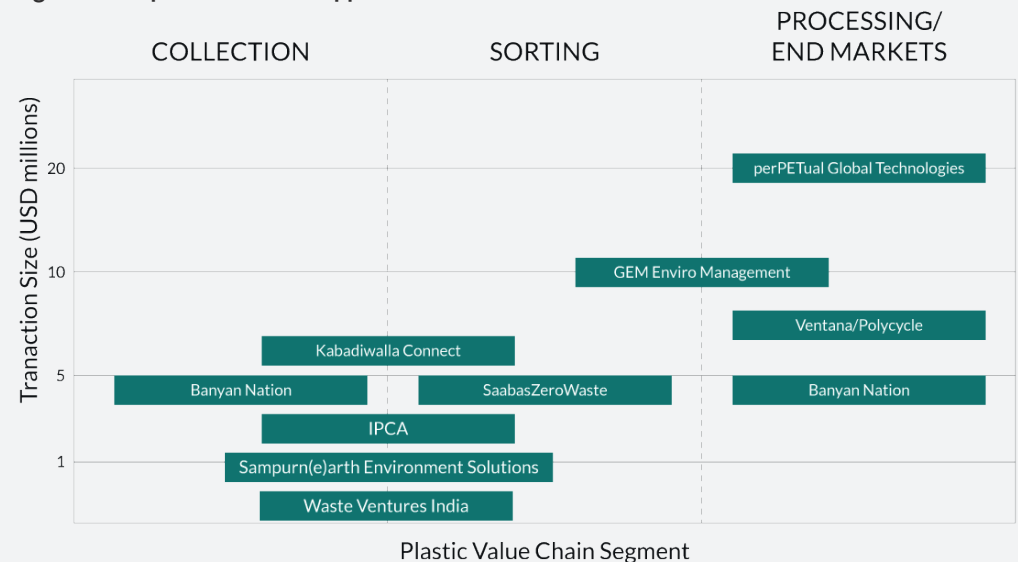
With Gol's implementation of an EPR policy for plastics, and its commitment to the Swachh Bharat campaign, Aavishkaar regards the current climate as being highly supportive of investment in the SWM space.



Some Potential Opportunities

Figure 8 comprises a sample of investment opportunities in the Indian plastic value chain identified during the landscape assessment conducted early 2018.

Figure 8 Sample Investment Opportunities in India



Collection and Sorting

Circulate Capital separates prospective investees undertaking collection into four categories, (although several companies undertake activities in more than one category):

- Contracted to a municipal or local authority that are paid pursuant to a tipping fee tied to the weight of waste transported to landfill (e.g., Ramky Enviro);
- Engaged by residential colonies to collect household waste (e.g., IPCA);
- Contracted by private companies and commercial developments to collect their waste (e.g., WVI, Sampurn(e)arth Environment Solutions); and
- Dealing directly with informal collectors and / or traders to purchase materials in higher value dry waste streams (e.g., Banyan Nation).

And, within the collection and sorting segment, Circulate Capital views funding requirements as falling into two groups:

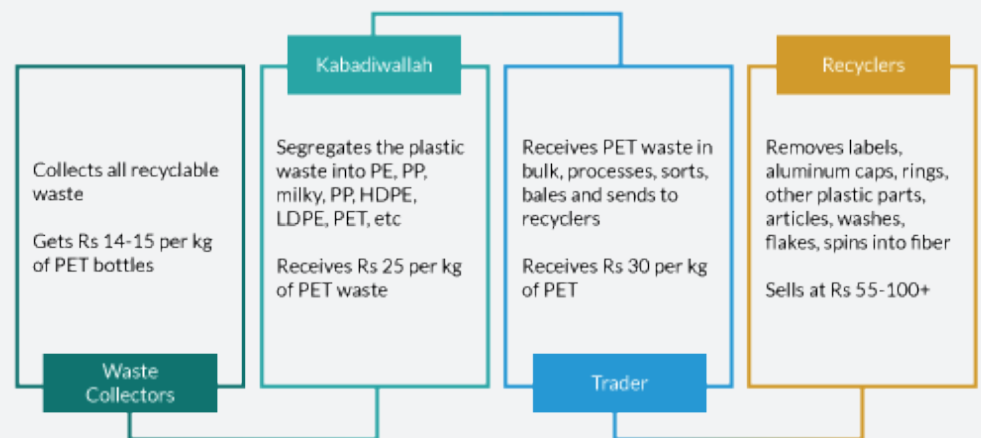
- Entities requiring investment of about US\$1 million or less, that are focused on building a larger presence in their home market or thinking about expanding to another major city through some form of franchise model (e.g., Waste Ventures India); and



- Entities requiring several million dollars to expand proven models to other cities (e.g., NEPRA-Let's Recycle) and/or which may have some proprietary software that seeks to facilitate more efficient collection and aggregation of waste streams (e.g., Saahas Zero Waste and Kabadiwalla Connect).

In both instances, investment capital offers the opportunity to aggregate disparate waste streams and to manage their sale in a more efficient manner that captures the value of those enlarged volumes to purchasers downstream in the plastic supply chain. Investment in this segment will likely involve engagement – either directly or indirectly – with informal collectors, who make up the base of the informal sector and undertake the initial collection of plastic waste. Figure 9 below illustrates their role in the plastics supply chain (highlighting PET) in India.

Figure 9:



Source: CSIR-National Chemical Laboratory (www.petrecycling.in)

Engagement with the informal sector promises the opportunity to enhance an investment's social impact. This is particularly so in the case of impact investors with a gender-lens metric, as a significant majority of the informal collector community is female. Waste Ventures India in Hyderabad, for example, is exploring ways to incorporate the globally recognized SA8000® Standard that seeks to ensure ethical working conditions into its operations.⁷²

The fixed cost of conducting due diligence generally precludes investment by traditional offshore PE and VC vehicles in entities requiring less than US\$10 million. These entities will often benefit from an incubation model that allows them to consolidate business models in home markets and develop where they're capable of absorbing larger investment sums. The fact that domestic Indian impact investors have been to the forefront of investment in the collection and sorting segments is therefore not surprising: Aavishkaar's multiple investments in NEPRA-Let's Recycle is a pertinent example.



The experience of such local investors marks them as invaluable prospective co-investors for new entrants to investment in the Indian SWM sector.

In several instances, access to sufficiently larger plots of land for locating a sorting facility is a barrier to greater aggregation of waste streams and more efficient operations. IPCA has several hundred self-employed informal collectors who operate from a myriad of small sorting spaces, having been unable for several years to secure a suitable site for a materials recovery facility from the relevant municipal authority in east Delhi.

Processing / End Markets

PET recycling rates range from an estimated 70-90 percent of annual domestic PET production, driven by domestic textile trade demand for feedstock for fiber and yarn production. That demand, in the absence of a market for food-grade product results in the rPET segment of the plastic value chain offering a number of processing investment opportunities.⁷³ However, there is a lack of transparency in sourcing. Investors seeking to measure the broader social impact of their investment within the plastic value chain may need to enter into a dialogue directly with the kabadiwalas who supply the processors to establish credible baselines for evaluation and measurement of plastic leakage.

Processing opportunities for other types of plastic waste appear more limited. Banyan Nation is a notable exception. The company, which is located in Hyderabad, is engaged in the recycling of HDPE and polypropylene for the consumer products and auto industries, and is as a raffia grade plastic for consumer durables. It has also developed a data intelligence platform that maps “last-mile” informal collectors.

Banyan Nation, Hyderabad, India

Banyan Nation was formed in 2014 by two Indian nationals who met while completing their graduate degrees in the United States. The company developed two business areas, a Better Plastic™ line of recycled HDPE and polypropylene, utilizing its self-developed plastics cleaning technology to increase the value-add of post-consumer and post-industrial waste plastic feedstock; and a data intelligence platform designed to integrate thousands of informal sector “last-mile” collectors into its supply chain.

Banyan Nation anticipates producing 10,000 tons per annum (tpa) of Better Plastic™ by 2021, comprising bottle/blow grade HDPE for fast-moving consumer goods and auto-grade polypropylene for

the automotive industry. By 2024, it anticipates producing 25,000 tpa, having added the production of raffia grade HDPE and polypropylene resins recycled from cross-woven HDPE/polypropylene bags used as packaging materials by the sugar, flour and cement industries in India.

In order to safeguard the requisite supply of feedstock that meets its specifications, Banyan Nation has begun to roll-out a “hub-and-spokes” model in southern and western India. Using third-party labor, it will presort post-consumer and post-industrial waste plastic into bales that will be transported to its manufacturing plant in Bangalore when sufficient volumes have been accumulated at each hub.

The SSEA landscape assessment did not focus on WtE opportunities in India, which tend to be large, capital intensive project financings located adjacent to existing landfills, where catalytic capital would appear to have a limited role to play. Ramky Enviro Engineers’ US\$90 million development of 24 megawatts WtE plant at Narela-Bawana, near Delhi – India’s largest municipal WtE plant – is an illustrative example. However, smaller ticket waste-to-fuel (WtF) or WtE projects, such as Ventana and Polycycl’s 15 tons per day (tpd) joint-venture near Hyderabad with Ramky Enviro Engineers, are examples of smaller projects investing in new technologies, where catalytic capital could be effective.

Producer Responsibility Organizations (PROs)

The imposition of an EPR regime in India has led to the development of entities that are self-described PROs (e.g., GEM Enviro Management and PRO India). PRO, or producer responsibility organization, is defined under the E-Waste (Management) Rules, 2016 as a professional organization authorized or financed collectively or individually by producers that takes responsibility for collecting and channelizing e-waste generated at the relevant product’s “end-of-life” to ensure environmentally sound management.



In the SWM space, PROs undertake analogous activities, such as assisting producer and brand-owner clients in fulfilling their EPR responsibilities, particularly the collecting of plastics.

In May 2018, the CPCB initiated a registration process for entities offering PRO services. A policy is being developed at the national level that will articulate the role of PROs in the plastic waste space with implementation anticipated by state governments individually. Circulate Capital believes that, uniquely among SSEA countries, Indian PROs offer investment opportunities in a business model that covers each of the collection, sorting, and recycling/end markets, in an environment where an impending policy statement encumbers investment in the short term.

GEM Enviro Management

GEM Enviro Management is a PRO formed to facilitate recycling of all kinds of packaging waste in India. It is engaged in three lines of business:

- Collection of prime scrap (e.g., PET, various kinds of plastics, plastic and jute bags, and paper) from 26 manufacturing plants owned in India by Coca-Cola, Pepsi and Bisleri;
- Operation under a franchise model of 14 post-consumer collection centers for PET in seven states; and
- Sale and marketing of merchandise made from recycled PET and paper, including clothing under the Being Responsible label, which is backed by one of the original investors in Ganesha Ecosphere Limited, the Bombay Stock Exchange-listed PET recycler.

GEM has an ambitious three-year plan to expand to 30-35 post consumer collection center franchises across India. In return for investing in these centers, GEM receives between 4 and 5 years of exclusivity from their owners for PET and other plastic streams. It intends to invest in technology that will track inventories at those centers and then monetize that data.

Pursuant to this strategy, in November 2018, the CPCB recognized GEM as a PRO for the collection and channeling of plastic waste on behalf of authorized producers and brand owners in furtherance of its EPR targets.



Investment Routes

A detailed examination of regulations governing foreign investment in India's SWM and recycling sector is beyond the scope of this handbook and prospective investors should consult Indian counsel in connection with specific opportunities. There are broadly four ways foreign financial investors can allocate capital to the sector:

- Foreign Direct Investment (FDI) route;
- Foreign Portfolio Investor (FPI) route;
- Foreign Venture Capital Investor (FVCI) route; and
- External Commercial Borrowing (ECB), extending a loan to an eligible Indian borrower.

Investment via each of the first three routes is governed by Reserve Bank of India (RBI) regulations that prescribe certain entry routes: the automatic route, which doesn't require specific approval of RBI or GoI, or the government route, which requires prior GoI approval, and limitations on investment, as a percentage of shares or the amount of a specific debt issuance. Foreign investment in the infrastructure sector, where the majority of the waste management and recycling sector falls, is open to 100 percent foreign ownership. However, an FPI's investments in shares of an Indian entity are permitted so long they are below 10 percent and listed on a stock exchange.

The primary benefit of the FVCI route, which requires registration with SEBI, is that it facilitates investment in financial instruments that are optionally convertible into an investee company's equity, which are omitted from the definition of capital instruments as applicable to the FDI and FPI routes. Further, the RBI's prescribed pricing guidelines upon entry into and exit of an investment do not apply. A portfolio-level assessment to ensure the business verticals are within the FVCI permitted sector list may be required on a case-by-case basis.

ECBs are commercial loans extended by foreign entities to Indian companies that are considered eligible borrowers under applicable RBI regulations. The regulatory framework for these loans consists of three tracks, with each track having prescribed minimum average maturity periods and cost ceilings on interest rates charged to borrowers as well as end-use restrictions. While Indian infrastructure companies are eligible to raise loans under the tracks and can do so in any freely convertible foreign currency or in Indian rupees (INR), they can only do so from foreign investors who are foreign equity holders – defined as a direct foreign equity holder with a minimum of 25 percent of the borrower's equity or an indirect foreign equity holder with a minimum of 51 percent, or from a group company with a common overseas parent. There are certain applicable limits on the sum that can be borrowed.



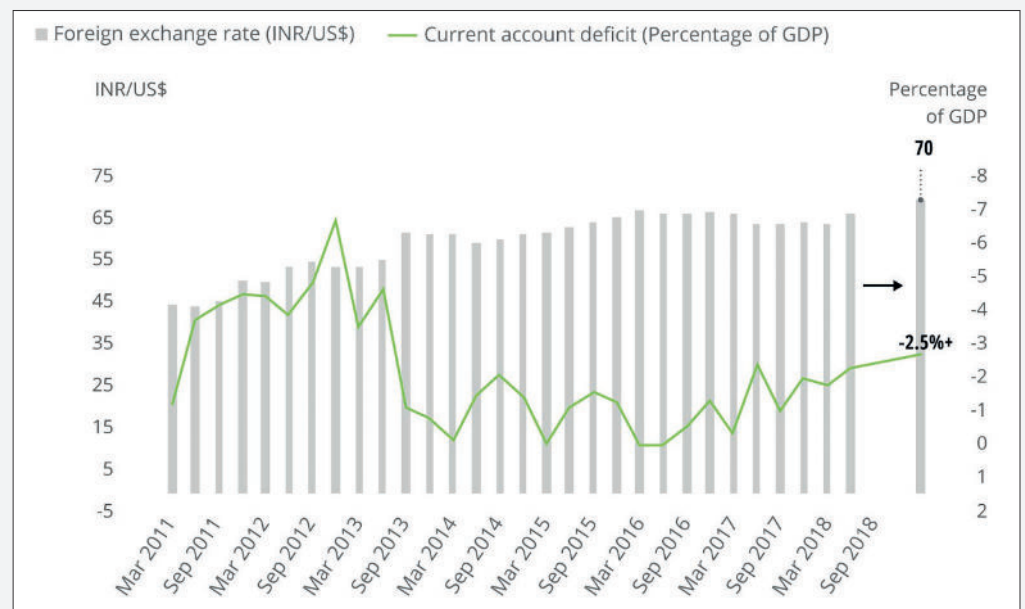
Possible Investment Risks⁷⁴

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Currency Risk

The Indian rupee's history of volatility against the U.S. dollar represents an inherent risk for foreign investors in India. Prompted by concern over a widening current account deficit and India's position as an import of oil, the Indian rupee hit an all-time low of INR74 against the U.S. dollar in early October 2018. As Figure 10 illustrates, this represents the continuation of a longer-term trend of depreciation against the U.S. currency.

Figure 10 India – INR / US\$ and Current Account Deficit, 2011-2018



Source: CEIC, Deloitte analysis

Political Risk

Political risk at the national level in India appears fairly low, as reflected in published political risk indices. And while the Swachh Bharat mission is closely associated with Prime Minister Modi and the BJP, there is no suggestion that if his party were to lose its majority in the Indian parliament in May 2019, a new government would abandon the EPR regime that has been a key characteristic of the Indian solid waste and recycling sector since 2016.



Conclusions

Driven by the efficiency of PET collection in India and its predominant usage in producing yarn and fiber for the textile industry, Circulate Capital sees **larger ticket opportunities – US\$5 million or more – for investors tending to fall within the processing segment of the plastic value chain.** While opportunities within the collection and sorting segment tend to be significantly smaller in size – US\$2-3 million or less – there are openings for these businesses to grow within the municipalities where they were founded and/or to expand their model to other cities with appropriate investment.

Further, Circulate Capital anticipates that such expansion will lead to the consolidation of these businesses through mergers and/or acquisitions that subsequently present opportunities to invest larger sums.

Finally, the evolution of PROs offers an opportunity to invest in entities that may bring more efficient aggregation of various plastic streams and more professional management to the supply chain to fulfill the EPR obligations of producer and brand-owner clients.



Indonesia: Country Overview



Introduction

GoRI has set itself the very ambitious target of reducing ocean plastic by 70 percent by 2025, and attracting foreign capital to the SWM and recycling sector will be crucial to achieving that goal. Legal developments providing for 100 percent foreign ownership of entities operating in the sector are designed to encourage such investment.

While Indonesia's financial markets are far from fully developed, its impact investment cohort is perhaps the most mature in Southeast Asia. Its CSOs are also vibrant and, in collaboration with other stakeholders in the plastic value chain, offer the potential to develop a holistic approach to investing in an integrated waste management system that collects and processes a number of plastic waste streams within well-defined wastesheds.

SWM Legal and Regulatory Scheme

In Indonesia, the issue of plastic waste is governed by two primary pieces of legislation:

- Waste Management Law of 2008 (Law No. 18/2008) that covers household solid waste; waste from commercial, industrial and special areas, and social and public spaces; and specific waste, including hazardous, construction and demolition waste.⁷⁵
- Environmental Protection and Management Law (Law No. 32/2009) that requires systemic and integrated efforts to preserve the environment and provides for the development of a national Environmental Protection Plan and the management of hazardous and toxic waste that might directly or indirectly endanger or destroy the environment.⁷⁶

The management of solid waste generally involves a complex interaction between, and often overlapping administrative responsibilities of, four principal central government agencies.⁷⁷ See Figure 11.

Figure 11:

Ministry of Environment and Forestry (MoEF)	Ministry of Public Works and Housing (MPWH)	Ministry of Development (BAPPENAS)	Coordinating Ministry of Maritime Affairs (CMMA)
Develops policies Formulates regulations Coordinates efforts in waste collection and recycling	Provision of technical advice Promotion of pilot projects Construction/supervision landfills/waste infrastructure	Infrastructure development with multilateral assistance	Ownership of National Marine Debris Action Plan

Source: World Bank, SYSTEMIQ



In an attempt to address the issue of ocean plastic mismanagement, GoRI has developed the National Marine Debris Action Plan, 2017-2025 that commits Indonesia to the goal of reducing marine plastic debris by 70 percent by 2025.⁷⁸ In pursuit of that goal, the plan identifies five pillars and strategies. See Table 12.

Figure 12:

Pillar	Strategy
1. Improving behavioral change	<p>At the local government level:</p> <ul style="list-style-type: none"> Strengthening human and financial resources Managing infrastructure and changing behavior Developing integrated coastal waste management projects
2. Reducing land-based leakage	
3. Reducing sea-based leakage	
4. Reducing plastic production and use	<p>At the national level:</p> <ul style="list-style-type: none"> Enhancing stakeholder awareness through education curriculum and public campaigns Converting waste into energy Implementing paid plastic bag policy Using plastic debris as asphalt mix for “plastic tar roads” Strengthening regulations concerning plastic debris management in seaports and by shipping and fishing fleets
5. Enhancing funding mechanisms, policy reform and law enforcement	
	<p>At the international level:</p> <ul style="list-style-type: none"> Funding the implementation of marine debris pilot projects within specific municipal areas through bilateral and regional cooperation
	<p>Among plastics manufacturers:</p> <ul style="list-style-type: none"> Encouraging the use of biodegradable plastics Seeking foreign investment in biodegradable plastics Introducing Circular Economy principles
	<p>Among Universities and Civil Society Organizations:</p> <ul style="list-style-type: none"> Encouraging R&D Establishing waste banks Introducing awareness campaigns



While these are important goals and strategies, further detail on implementation is still needed. From a practical perspective, a potentially greater challenge to achieving the targeted reduction in marine debris is the fact that an estimated 80 percent of marine debris comes from land-based sources with ineffective waste management systems. Regencies and municipal governments are ultimately responsible for implementing SWM throughout the Indonesian archipelago,⁷⁹ not the national government. With the introduction of rapid decentralization after the fall of the Suharto regime in 1998, the central government has less authority. As impeded as the regencies and municipalities are by an absence of funds – both from an operating budget and capital investment perspective – and technical skills, national laws and policies remain neither implemented nor enforced in many localities.

Finally, Article 15 of Law No. 18/2008 obligates “producers . . . to manage product packaging and / or products that cannot be easily decompose naturally.”⁸⁰ While authority for this EPR policy has been delegated to MoEF, the relevant implementing regulations have not yet been issued.⁸¹

Investment Landscape

While the Indonesian PE/VC sector is not as developed as its counterpart in India, its impact-investing ecosystem has been identified as the most mature in Southeast Asia, with a range of local, regional and global players active in the country. Analyzing the impact investments made from 2007 to 2017 reveals a marked division between investors that have a local presence and those that do not, with the former dominating seed and early stage investments with a ticket size of less than US\$500,000, the most common deal size given the large number of early stage investment opportunities.⁸²

However, none of the impact investors specialize in the SWM and recycling sector, with the bulk of investments observed falling in the agriculture, financial services and environmental (e.g., sustainable fisheries and forestry) sectors. In the SWM and recycling space, early stage waste collection and sorting ventures have been supported by investments of less than US\$500,000 by Indonesia-based HNWI. For example, Waste4Change, a Jakarta-based waste management company, has received investment from both an Indonesian HNWI and the founder of ecoBali Recycling.

The lack of experience in the SWM and recycling sector, notwithstanding, the impact investment ecosystem in Indonesia represents a pool of potential co-investors that would likely be attracted by the environmental and societal impacts investment offers.

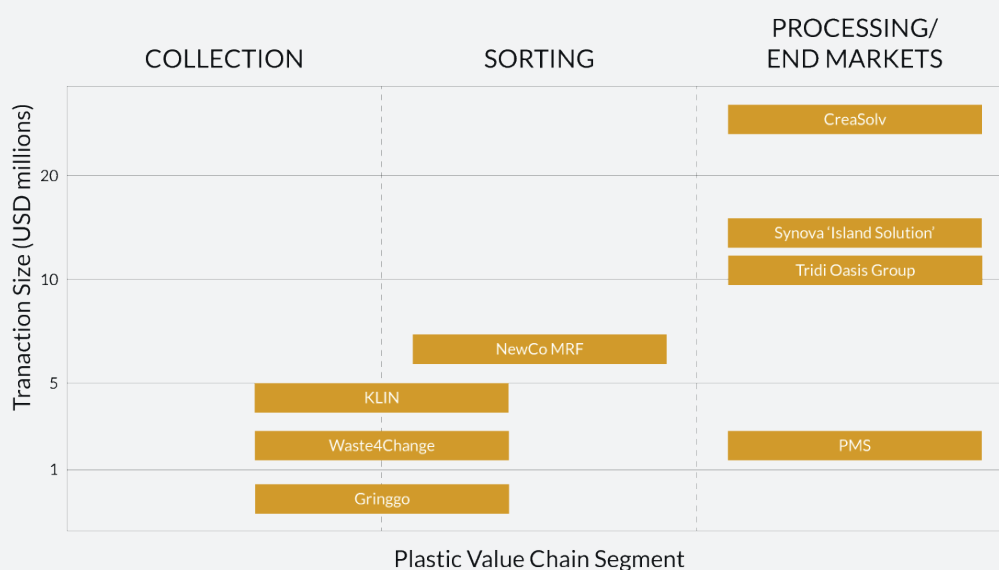
Some Potential Opportunities

As Figure 13 illustrates, the landscape assessment identified entities in each stage of the plastic value chain that require capital. Circulate Capital views these opportunities as falling into three broad categories:



- Seed and early-stage investments in the collection and sorting segments seeking investment capital of US\$500,000 to US\$2 million;
- Processing/end-market investments, seeking US\$5+ million, in two sub-categories, including PET and other higher financial/calorific value plastics (e.g., HDPE, LDPE) and WtE projects; and
- Assets that are not yet in an investable corporate vehicle (e.g., leases over collection and sorting facilities).

Figure 13: Sample Investment Opportunities in Indonesia



Collection and Sorting

As with other SSEA countries, separation at source is generally absent and contamination of dry waste is prevalent in Indonesia. Thus, there is a need for holistic waste management solutions. The World Bank estimates that organic waste comprises on average about 63 percent of municipal solid waste in Indonesia. It is estimated that cities with high GDP per capita and higher growth have a lower organic composition of about 55-60 percent, while cities with lower GDP per capita and slower growth have a higher organic composition of about 65-75 percent.⁸³

In Circulate Capital's opinion, the implementation of municipal regulations requiring restaurants, commercial office blocks, hotels and developers of new housing developments to collect and transport waste offer opportunities for new businesses to enter the SWM sector. In many parts of the world, successful recycling businesses manage waste from commercial sources, which produce high quality waste and residential sources, which produce higher volume of waste. Waste4Change in Jakarta (see below) and Gringgo in Bali are examples of such businesses. However, many of these ventures are first established as yayasans, or foundations, under Indonesian law and need to adopt a corporate form to receive investment capital.



Further, the ticket sizes available combined with the need for other ancillary services (e.g., management advice and mentorship focusing of business models) suggest that early stage businesses would benefit from incubation focused on scaling them to the point where they could confidently deploy external capital of US\$2.5+ million.

Waste4Change

Bijaksana Junerosano began Greeneration, a social enterprise focused on environmental issues, as a student at Bandung Institute of Technology in 2009. After partnering with ecoBali in late 2014 and receiving additional funding from a HNWI, he established Waste4Change as a new legal entity.

Based in the Greater Jakarta region, Waste4Change has

two principal revenue streams: consulting on responsible waste management, and collecting, sorting and selling organic and inorganic municipal solid waste. Clients for its waste management services include Unilever, Coca Cola and Body Shop Indonesia. It operates a small manual materials recovery facility, processing about 15 tpd, located near the Bantar Gebang landfill outside Jakarta, selling recovered plastic,

principally high value, non-flexibles, to local recyclers. The principal restraints on growing its waste management services include a general reluctance to pay for such services, other than well-known brands and higher income earners, the need for financial and human capital, broader managerial experience and access to additional land.

Processing/End Markets

Processing

As in other SSEA countries, the collection of PET by the informal sector, and its subsequent recycling, is relatively efficient. In contrast, the collection and recycling of flexible packaging is poor.⁸⁴

Market participants also note changes to transport patterns for high value plastic in Indonesia since China's imposition of the National Sword policy in 2018. Plastics that formerly were shipped to China from Sumatra and Kalimantan/Nusa Tenggara are now finding their way into the Jakarta and Surabaya wastesheds, respectively.

Circulate Capital believes the investment opportunities identified during the landscape assessment reflect those market dynamics. For example, in the Surabaya wasteshed (i.e., a corridor broadly running from Malang to Surabaya), Veolia – the Euronext-listed water, waste, and energy company – is investing in a new rPET facility near Surabaya. Danone, which has around 40 percent of the country's bottled water market through its Aqua brand, will be an early buyer from the facility. In addition to relying on the informal collector sector and traders to supply PET bottles for recycling,



Veolia intends to leverage Danone's commitment to improving collection at a number of non- and under-utilized TPS (collection point) and TPS3R (transfer collection point with sorting capabilities) collection locations, principally on Java, to source up to 10 percent of its feedstock requirements.

Also in Surabaya wasteshed, Circulate Capital understands that an Indonesian family-owned enterprise involved in HDPE, LDPE and polypropylene recycling is exploring a greenfield expansion that would utilize both domestic and imported plastic waste.

In the Jakarta wasteshed, a corridor broadly running from Bandung to Jakarta, Tridi Oasis Group, a women-owned and managed producer of sheet grade rPET, is seeking to expand its product mix. It intends to invest in new plant

Tridi Oasis Group, Jakarta, Indonesia

Established in 2016, Tridi Oasis Group is a women-owned and managed producer of high- and medium-grade rPET flakes for the packaging and textile industries. Based in Tangerang, near Jakarta in Indonesia, its current annual production is about 2,000 metric tons with a target of 14,000 metric tons by 2020. This growth will see the company move increasingly

toward the production of food grade – the bottle-to-bottle market – rather than sheet grade rPET flakes and a larger proportion of overseas sales.

Tridi Oasis Group notes that a significant portion of PET bottles in Indonesia may not be recycled as a result of poor collection and contamination-related losses

during the recycling process.⁸⁵ Therefore, to maintain the quality and cost competitiveness of its feedstock, the company is developing direct channels that dis-intermediate traders: trash banks, schools and universities, and housing developments in and around greater Jakarta.

End Markets

The use of plastic waste to create energy is an element within the national-level strategy of GoRI's National Marine Debris Action Plan. An attempt to accelerate investment in this space was derailed when, in early 2017, the Indonesian Constitutional Court decided that the 2016 Presidential Regulation doing so contradicted the requirements of Law No. 32/2009.

However, a new Presidential Regulation in May 2018 remedies that conflict and establishes a more solid framework for developing plastic waste-based WtE projects.



The key features are:

- An expansion of cities targeted for projects,⁸⁶
- Assignment of authority by governors and mayors to regional state-owned enterprises to conduct public tenders for projects,
- Dual roles for project developers as waste managers by entering into a waste management agreement with the relevant local authority, and power generators through entry into a power purchase agreement with PLN (Indonesian state-owned electricity company),
- 100 percent foreign ownership, and
- New single feed-in tariff and a subsidy from the state budget for the payment of tipping fees.

While developers comment that several of the project sites look potentially attractive with the new feed-in tariff and tipping fee, there is additional analysis to be undertaken on specific opportunities. A significant element of that analysis will be an assessment of the relevant waste feedstock composition and the reliability of its supply, which Circulate Capital sees as offering opportunities for investment in collection and sorting infrastructure. Project developers will likely need capital to invest in existing or new infrastructure to affect the waste management activities that the presidential regulation requires WtE project developers to undertake, as well as in developing new infrastructure to manage additional sources of waste that may be needed to support the project's power generation activities.

Lease on TPS 3R

The landscape assessment identified situations where a potentially valuable waste management asset was not investable because it was not held in a corporate structure and/or it required experienced management to realize its value. One such example is the possibility of securing a 15-year lease for a TPS 3R located in southwest Jakarta.

At 4,500 square meters, the property is considerably larger than usual for a collection unit in Indonesia and could house a materials recovery facility. Its location – within the series of motorways that form a circle with the DKI Jakarta region – is close to a series of existing housing developments and new developments that could provide new waste streams. For example, Kawasan Industri Jababeka, a listed property developer that owns one of the largest land banks in Indonesia, is actively seeking waste management solutions for future development projects.

Additionally, a recent presidential regulation identified Jakarta as one of the cities targeted for plastic waste-based WtE projects. Any developer will be required, under the terms of that regulation, to manage waste as feedstock for the project, offering the potential for off-take contracts for any materials recovery facility constructed at the TPS 3R.

Despite the attractiveness of the asset, it is not an investable vehicle, nor does it have an associated management team that can develop its potential. Additionally, legal title to the property would need to be assured, no small task given that the facility was constructed by the MPWH, and the existing TPS 3R facility falls within the bailiwick of the Jakarta provincial government. Similar assets exist elsewhere in Indonesia. Of the 1,050 TPS 3Rs across Indonesia, it is believed that only 10 percent are actually utilized.⁸⁷

Project Cities and Hot Spots

In connection with a prospective SWM-related loan to Indonesia, the World Bank undertook a comprehensive review of 104 cities and urban districts with populations in excess of 100,000 in order to determine which have the most promise to implement waste management systems and could serve as potential role models for other Indonesian cities. Those cities and districts were divided into three tiers:

- Tier 1 cities/districts that demonstrated high past performance and commitment to SWM, consequently justifying large investments in complex systems and advanced treatment technologies;
- Tier 2 cities/districts with average past performance and medium potential for future development, and therefore determined to be strong candidates for smaller or incremental investments but not full systems; and
- Tier 3 cities/districts unlikely to be included in any loan-related program because of weaker past performance and perceived commitment to SWM, as well as with limited resources.



An associated World Bank report sought to “provide an informed and focused analysis of land-based leakage of solid waste, particularly plastics, to the marine environment” from 15 cities in western and central Indonesia (i.e., plastic leakage hotspots).⁸⁸ The report is intended to assist GoRI’s response to “the growing crisis of plastics and debris in the country’s and world’s oceans.”⁸⁹

Figure 14:

Cities and Urban Districts	
Tier 1	Tier 2
<ul style="list-style-type: none"> • Balikpapan • Bitung • Surabaya • Makassar • Jakarta 	<ul style="list-style-type: none"> • Denpasar • Padang • Manado • Medan
Source: World Bank	

Figure 14 illustrates the Tier 1 and 2 cities and urban districts that were the subject of the World Bank hotspot analysis. Those in bold typeface are the cities targeted for WtE development projects in the recent Presidential Regulation. These cities take in the Jakarta and Surabaya wastesheds and cities on the well-populated islands of Bali (Denpasar) and Sulawesi (Makassar and Manado).⁹⁰ Given the confluence of proven past commitment to SWM by the local political authorities, likely investment opportunities along the plastic value chain brought about by WtE projects, and prospective development capital from DFIs, it seems prudent for investors seeking to remediate the flow of mismanaged plastics to explore these plastic waste hotspots.

Systemic Collaboration

Circulate Capital sees great potential for investors and other stakeholders, particularly CSOs, in the SWM/recycling space to have disproportionate increased impact if they collaborate in a manner that builds capacity along the plastic value chain and adopt a systemic approach.

In the Surabaya wasteshed, for example, Veolia, assisted by Danone, will use the efficacy of the existing PET collection infrastructure while seeking to build out currently non- or underutilized collection centers; Unilever is embarking on a pilot program for its CreaSolv technology that relies upon multi-layer plastics as a feedstock; and the US\$4 million Borealis-sponsored Stopping the Tap on Ocean Plastic (STOP) program views the proximity of Surabaya (about 200 kilometers), and its role as an end market, key to deriving greater value from the city’s waste streams.



Collaboration between these entities, combined with strategic investment in and partnership with local companies involved in collecting and recycling other plastic polymers (e.g., PP, HDPE and LDPE), could promote more comprehensive collection and a concomitant reduction in leakage of plastics to the ocean, as well as provide the foundation for the development of an economically sustainable waste management system.

Localized Solutions

As an archipelagic nation, Indonesia comprises over 17,000 islands with vastly differing populations and waste management infrastructure. On many islands, there is no market for plastic waste and transportation costs mean that it is uneconomical to ship waste elsewhere. In these locations, technological solutions adapted to suit the local waste profile may offer investment opportunities. Synova Power's Island Solution – a small syngas unit costing around US\$12 million, with the capacity of 73 tons per day of MSW capable of producing refuse-derived fuel or electricity – is an example of technology that could be adapted for these locations.

Investment Restrictions

Foreign investment in Indonesia is regulated by a negative investment list that is maintained by the Indonesian Investment Coordinating Board (BKPM). Prior to the issuance of the revised list in May 2016 (2016 Negative List), foreign ownership of entities involved in non-hazardous waste management and disposal was limited to 95 percent. The 2016 Negative List permits 100 percent foreign ownership. Prospective equity investors in the SWM and recycling space in Indonesia must obtain approval from BKPM for their investment. This can take some time, requiring a dialogue with BKPM to decide upon the appropriate KBLI for the investee company's activities. Depending upon the applicable KBLI, an additional license and notification to other relevant government agencies may be required.

Providers of debt capital should note Bank Indonesia's restrictions on offshore borrowing by non-bank companies. Issued in December 2014, the Indonesian Central Bank's regulation and associated circular letter on the Implementation of Prudential Principles in Managing Offshore Loans by Non-Bank Corporations, or PB No. 16/21, require Indonesian companies other than banks to implement certain prudential principles in relation to their foreign currency borrowings.⁹¹ These include three primary obligations concerning the maintenance of prescribed hedging and liquidity ratios, determined by reference to the borrower's foreign currency liabilities, as well as a minimum credit rating subject to certain exemptions. The impact of these restrictions will likely limit the ability of would-be lenders to extend loans denominated in a foreign currency in some instances.



Possible Investment Risks⁹²

Currency Risk

As with several other emerging market currencies, the Indonesian rupiah has a history of volatility against the U.S. dollar. Figure 15 illustrates that the Indonesian currency has been consistently depreciating against the green-back since 2011. However, that depreciation accelerated markedly during 2018. In fact, in September and again in October, the rupiah hit 20-year lows, approaching the currencies nadir low in the aftermath of the Asian financial crisis.

Figure 15 Indonesian rupiah vs. U.S. dollar (INR/USD), 1997-2018



Source: Financial Times, Bloomberg Data

With a current account deficit approaching almost 3 percent of GDP and a high level of foreign debt – 34 percent of GDP – relative to its Asian peers, the currency is prone to bouts of volatility.

Political Risk

A Financial Times Confidential Research survey in October 2018 concluded that, despite “Indonesia’s sluggish growth, ballooning current account deficit and a currency that is languishing at levels last seen during the 1997 Asian financial crisis,” President Widodo remains on track to win a second term in April 2018.⁹³ And this belief, at the national level, is reflected in the Political Risk Index compiled by Marsh & McLennan referenced above.

In recent years, Indonesia’s economic nationalism has tended to be confined to the resource sector, with the campaigns to take back assets from Freeport-McMoRan Inc., Total SA and Chevron Corp prime examples.



A possible up-tick in nationalist rhetoric during the forthcoming election notwithstanding, Circulate Capital does not anticipate the waste management and recycling sector will be so affected, particularly when discarded plastic is regarded as a nuisance rather than a valuable resource.

Political risk at the municipal level is more difficult to gauge. The 2016-17 coordinated campaign against then Jakarta Governor Basuki Tjahaja Purnama, known colloquially as “Ahok,” concerning accusations of blasphemy and his subsequent criminal conviction that removed him from office, is a prime case in point.

Conclusions

The World Bank recently commented that “[t]he waste management challenges facing Indonesia are formidable, but they are by no means insurmountable. The [g]overnment . . . is addressing its marine debris challenge head on, and can help turn the tide for East Asia. The bulk of Indonesia’s challenge to halt marine debris involves addressing its inadequate municipal waste management service provision.”⁹⁴ Integral to the success of any effort to tackle those inadequacies, Circulate Capital believes, is the injection of private capital in a systematic manner along the plastic value chain in defined wastesheds. It also requires the consistent support of relevant local municipalities and the collaboration of investors with other stakeholders to ensure the creation of a holistic waste management framework.



Appendices

Appendix A:

Waste Generation and Disposal in SSEA Countries



Waste Generation

	Country				
	India	Indonesia	Philippines	Thailand	Vietnam
Income	LMIC	LMIC	LMIC	LMIC	LMIC
Original Year Reported					
MSW Generation (TPA)	168,403,240	65,200,000	14,631,923	26,853,366	9,570,300
Population (000s)	1,071,478	261,115	103,320	68,658	86,932
Year	2001	2016	2016	2015	2010
2016 Adjusted					
MSW Generation (TPA)	277,136,133	65,200,000	14,631,923	27,268,302	11,562,740
Population (000s)	1,324,171	261,115	103,320	68,864	94,569
2030 Projected					
MSW Generation (TPA)	387,770,524	87,958,248	20,039,044	32,484,794	15,922,186
Population (000s)	1,512,985	295,595	125,372	69,626	106,284
2050 Projected					
MSW Generation (TPA)	543,277,457	118,551,290	29,275,773	37,342,182	21,961,818
Population (000s)	1,658,978	321,551	151,293	65,372	114,630

Source: World Bank

Waste Treatment and Disposal

	Country				
	India	Indonesia	Philippines	Thailand	Vietnam
Income	LMIC	LMIC	LMIC	LMIC	LMIC
Open Dump	77.0	10.0		53.5	
Landfill Unspecified		69.0		27.0	
Controlled Landfill					
Sanitary Landfill					
Recycling	5.0	7.0	28.0	19.1	23.0
Composting	18.0				15.0
Anaerobic Digestion					
Incineration				0.4	
Advanced Thermal Treatment					
Waterways					
Other		14.0			
Unaccounted for			72.0		62.0

Source: World Bank

Appendix B:

India & ASEAN Waste Management Funding Rounds (2008-18)



Company Name	Investor Name	Funding Data	Funding Amount (\$M)*	Round Name	Country
Attero Recycling	Forum Synergies;DFJ;IndoUS Venture Partners;Kalaari Capital;Granite Hill Capital Partners	Aug-14	16.5	Series C	India
inTarvo	New Enterprise Associates	Sep-09	14	Series B	India
Attero Recycling	Granite Hill Capital Partners;IndoUS Venture Partners;DFJ;IFC	Aug-10	8.3	Series B	India
inTarvo	Motilal Oswal	Oct-07	7.9	Series A	India
Nepra/Let's Recycle	Aavishkaar; Asha Impact	Jun-18	6.5	Series B	India
Attero Recycling	DFJ;IndoUS Venture Partners	Aug-08	6.3	Series A	India
Ganesha Ecosphere	MCap Fund Advisor	Sep-14	5	PE	India
Pastiwala	na	Apr-15	4	Series A	India
Nepra	Aavishkaar	Jan-13	2.5	Seed	India
Let's Recycle	Aavishkaar	Jan-13	2.5	Series A	India
Let's Recycle	Aavishkaar	May-15	2	Series A	India
RenewGEN Enviro Ventures	na	Mar-14	0.81	Angel	India
Banyan Nation	Artha	Mar-16	0.8	Seed	India
RenewGEN Enviro Ventures	na	Jan-11	0.64	Angel	India
Karma Recycling	Infuse Ventures;The Low Carbon Enterprise Fund	Jun-15	0.44	Seed	India
Sampurnaeearth	ah! Ventures;Intellect Impact Investment Network	Aug-15	0.15	Seed	India
KabadiExpress	na	Jun-16	0.15	Seed	India
Daily Dump	Ankur Capital	Feb-15	0.08	Seed	India
Karma Recycling	na	Oct-13	0.02	Angel	India
Elrhino Eco Industries	Upaya Social Ventures	Mar-14	0.01	Seed	India
Nepra	Aavishkaar	May-15	Undisclosed	Seed	India
EcoCentric Management	na	Dec-16	Undisclosed	Series A	India
Encashea	TracxnLabs	Aug-16	Undisclosed	Seed	India
Saahas	Indian Angel Network;Upaya Social Ventures	Aug-15	Undisclosed	Angel	India
Zuci Energy	na	Oct-14	Undisclosed	Seed	India
ReNew IT	Villgro Innovations Foundation	Jun-14	Undisclosed	Seed	India

Appendix B:

India & ASEAN Waste Management Funding Rounds (2008-18) (cont'd)



Company Name	Investor Name	Funding Data	Funding Amount (\$M)	Round Name	Country
Revive	Infuse Ventures	Mar-14	Undisclosed	Seed	India
Waste Ventures	Toniic	Jun-13	Undisclosed	Seed	India
Waste Ventures	Village Capital;Dasra	Jun-12	Undisclosed	Seed	India
Hanjer	na	May-09	Undisclosed	Series A	India
Eco	Navis Capital Partners	Jun-07	Undisclosed	PE	Singapore
HiGi Energy	na	Aug-15	Undisclosed	Seed	Malaysia
TES-AMM	Navis Capital Partners	May-13	Undisclosed	PE	Singapore

Appendix C:

Selected Stakeholders in South and Southeast Asian SWM and Recycling



Landscape Assessment Sponsors

3M

www.3m.com

Dow

www.dow.com

Procter & Gamble

www.us.pg.com

Partnerships in Environmental Management
for the Seas of East Asia

www.pemsea.org

World Plastics Council

www.worldplasticscouncil.org

The Coca-Cola Company

www.coca-cola.com

Kimberly-Clark

www.kimberly-clark.com

PepsiCo

www.pepsico.com

American Chemistry Council

www.americanchemistry.com

Regional

Development Financial Institutions (Multilateral and Bilateral)

Asian Development Bank

www.adb.org

IFC

www.ifc.org

USAID – Development Credit Authority
<https://www.usaid.gov/what-we-do/economic-growth-and-trade/development-credit-authority-putting-local-wealth-work>

World Bank (IBRD)

www.worldbank.org

Department of Foreign Affairs and Trade (Australia)

www.dfat.gov.au/pages/default.aspx

InfraCo Asia

www.infracoasia.com

USAID – Municipal Solid Waste Program
<https://www.usaid.gov/vietnam/partnership-opportunities/mwrp-aps-amendment-2>



Appendix C: Selected Stakeholders in South and Southeast Asian SWM and Recycling (cont'd)

Miscellaneous

ADM Foundation
www.admcapital.com/foundation

UNEP
www.unenvironment.org

Blended Finance Taskforce
www.blendedfinance.earth

GA Circular
www.gacircular.com

Global Alliance for Incinerator Alternatives
www.no-burn.org

SWM / Recycling Entities

Veolia
www.veolia.com

Synova Power
www.synovapower.com

India

SWM / Recycling Entities

Banyan Nation
www.banyannation.com

IF&LS
www.ilfsindia.com

Kabadiwalla Connect
www.kabadiwallaconnect.in

Ramky Group
www.ramky.com

Sampurn(e)arth Environment Solutions
www.sampurnearth.com

Waste Ventures India
www.wasteventures.com

GEM Enviro Engineering
www.gemrecycling.com

IPCA
www.ipcaworld.co.in

Pro-India
www.pro-plastics.in

SaahasZeroWaste
www.saahas.com

Ventana / Polycycl Private Limited
www.polycycl.com

Investment Funds

Aavishkaar
www.aavishkaar.in

Asha Impact
www.ashaimpact.com

Appendix C: Selected Stakeholders in South and Southeast Asian SWM and Recycling (cont'd)



Plastics Producers

Reliance Industries Ltd
www.ril.com

Indonesia

SWM / Recycling Entities

Bintang Sejahtera NTB
www.bintangsejahtera.co.id

Gringgo
www.gringgo.co

Pelita Mekar Semesta
www.pelitamekarsemesta.com

Tridi Oasis Group
www.tridi-oasis.com

ecoBali Recycling
www.eco-bali.com

Langgeng Jaya Fiberindo
www.ljfiber.co.id

Waste4Change
www.waste4change.com

CSOs / Trade Associations

ADUPI
www.adupi.org

Indonesian Solid Waste Association (IsSWA)
www.inswa.or.id

APDUPI
www.indonesianwaste.org/portfolio-item/apdupi-2

PRAISE
www.apki.net/wp-content/uploads/2017/07/Praise.pdf

CPGs

Danone
www.danone.com

Unilever Indonesia
www.unilever.co.id

Appendix C: Selected Stakeholders in South and Southeast Asian SWM and Recycling (cont'd)



Miscellaneous

Evoware
www.evoware.id

Plastic Energy Ltd
www.plasticenergy.net

Marine Change
www.marinechange.com

McKinsey.org
www.mckinsey.org

SystemIQ
www.systemiq.earth

Second Muse
www.secondmuse.com

Tropical Landscape Finance Facility Indonesia
www.tlffindonesia.org

Philippines

SWM / Recycling Entities

SURE Waste2Worth
www.sureinc.wixsite.com

Green Antz
www.greenantzbuilders.com

Miscellaneous Financial Institutions

Development Bank of the Philippines
www.devbnkphl.com

Metro Pacific Investment Corp
www.mpic.com.ph

CSOs / Trade Associations

Philippines Plastics Industry Association
www.philippineplastic.com

Philippine Alliance for Recycling and Materials
Sustainability (PARMS)
www.parms.com.ph

Solid Waste Management Association of the
Philippines
www.swapp.org.ph

Villar Foundation
www.cynthiavillar.com.ph



Appendix C:

Selected Stakeholders in South and Southeast Asian SWM and Recycling (cont'd)

Thailand

SWM / Recycling Entities

Thai Plastic Recycle Group Co. Ltd.
www.thaiplasticrecycle.com

Wongpanit
www.wongpanit.com

CSOs / Trade Associations

Thailand Institute of Packaging and Recycling
Management for Sustainable Environment (TIPMSE)
www.tipmse.or.th

Ancillary Industries

SCG
www.scg.com

Indorama Ventures
www.indoramaventures.com

Vietnam

SWM / Recycling Entities

ENDA
www.endavn.org.vn

Green Desert Company Limited
www.greendesertwte.com

CSOs / Trade Associations

GreenHub
www.greenhub.org.vn

Vietnam Business Council for Sustainable
Development
www.vbcسد.vn

Investment Funds and Advisors

Patamar Capital
www.patamar.com

Lotus Impact
www.lotusimpact.com

Energy Capital Vietnam
www.ecvholdings.com



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Business Council for Sustainable Development	Malaysia Packaging Manufacturers Association
Singapore Ltd	Manor Pte. Ltd.
Danone Asia Pte Ltd	Procter & Gamble Asia Pacific
Dow	Singapore Economic Development Board
Forum for the Future	Standard Chartered Bank
GA Circular	UK Embassy
ID Invest	Wood Mackenzie

Indonesia

ADM Capital	Marine Change
ADM Foundation	Norwegian Embassy
ADUPI	Planet Equity Fund
APDUPI	PRAISE
Arnfinn Jacobsen	PT Coca-Cola Indonesia
Bintang Sejahtera NTB	PT Langgeng Jaya Fiberindo
Body Shop Indonesia	PT NW Abadi
Charles Saerang	PT Pelita Mekar Semesta
Coordinating Ministry for Maritime Affairs	PT Tirta Investama (Danone Aquq Group)
Danish Embassy	SecondMuse
Department of Foreign Affairs and Trade (Australia)	Sustainable Waste Indonesia
Development Investment Group	SystemIQ
Evoware Plastic Energy Ltd	The Ocean Cleanup
Felia Salim	Tropical Landscape Finance Facility Indonesia
Gikoko	U.S. Consulate (Surabaya)
Gringgo	U.S. Embassy (Jakarta)
Goldman Sachs Indonesia	USAID Municipal Solid Waste Program
InSWA	Veolia
KLIN Indonesia	Waste4Change
Made Marthini, Ministry of Trade	World Bank
Mahanusa Capital	



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Banyan Nation
Coca Cola Hindustan
Coca Cola Pvt. Ltd.
Confederation of Indian Industries
GEM Enviro Management
IF&LS
IPCA

Kabadiwallah Connect
MCap Fund Advisors
Ramky Group
Reliance Industries
Saahas Zero Waste
Sampurn(e)arth Environment Solutions
Ventana/Polycycle Private Limited
Waste Ventures India

Philippines

ADB
American Chamber of Commerce of the Philippines
Belen Fernandez, Mayor of Dagupan
Century Pacific Food, Inc.
Coca-Cola Far East Limited
D&L Industries, Inc.
Development Bank of the Philippines
Francis Estrada
Green Antz
Jade Marine
Metro Pacific Investment Corp
National Solid Waste Management Commission
Nestlé Philippines, Inc.
NoBurn.org

PEMSEA
Philippine Alliance for Recycling and Materials
Sustainability (PARMS)
Philippine Congressional Committees on Ecology,
Natural Resources, Science and Technology
Philippine Plastics Industry Association
Province of Cavite
Satrap Corporation
Senator Cynthia Villar
SURE Waste2Worth
SWAPP
Synova Power
TrashTalk
U.S. Embassy

Thailand

Castle Partners Co. Ltd.
Coca-Cola (Thailand) Limited
Indorama Ventures Public Company Limited
Ministry of Tourism & Sport
Synova Power
SCG
Thai Beverage Public Company Limited

Thailand Institute of Packaging and Recycling
Management for Sustainable Environment
Thaiplastic Recycle Group Co. Ltd.
UNEP
U.S. Embassy
Wongpanit



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Vietnam

Coca-Cola Southeast Asia Inc.
ENDA
Energy Capital Vietnam
Green Desert Company Limited
GreenHub
Lotus Impact
Ministry of Natural Resources and Environment

Patamar Capital
Unilever Vietnam International Co., Ltd
U.S. Embassy (Ho Chi Minh City)
U.S. Consulate (Hanoi)
Vietnam Business Council Sustainable Development
Vietnam Waste Solutions

Academic

Dr. Jenna Jambeck, University of Georgia



Investing to reduce plastic pollution in South & Southeast Asia: A HANDBOOK FOR ACTION

Endnotes

- 1 “Plastic waste inputs from land into the ocean,” J. Jambeck, et al., *Science* (13 Feb 2015). Available at <http://science.sciencemag.org/content/347/6223/768.full>
- 2 “Microplastics found in human stools for the first time,” F. Harvey and J. Watts, *The Guardian* (October 22, 2018) available at <https://www.theguardian.com/environment/2018/oct/22/microplastics-found-in-human-stools-for-the-first-time>
- 3 While China is the largest contributor to the leakage of mismanaged plastics to the ocean, owing to a shifting domestic regulatory environment for plastic waste, together with the challenges of managing foreign investments in the country, it was omitted from the scope of this particular assessment.
- 4 See ‘Figure 1: Segments of the Plastic Value Chain Assessed’ on pp 20.
- 5 There is much debate globally about the role WtE projects should play in waste management systems. Whether they should and, if so, what existing or new technologies should be utilized is outside the scope of this handbook, which merely notes the activity in that segment of the plastic value chain.
- 6 See, e.g., “The Chinese import ban and its impact on global plastic waste trade,” A. Brooks, et al., *Science Advances* (20 June 2018) available at <http://advances.sciencemag.org/content/4/6/eaat0131.full>
- 7 *The Landscape for Impact Investing in Southeast Asia*, GIIN/Intellectcap (August 2018) at pp 18.
- 8 The risks discussed in this section constitute only a few examples of the wide variety of risks confronting investors in emerging markets. Similarly, the topics discussed under the Investment Risks sections that follow in this handbook do not purport to be a comprehensive or exhaustive discussion of the investor risks.
- 9 *Waste of a Nation: Garbage and Growth in India*, A. Doron and R. Jeffrey (Harvard University Press 2018) at pp 253 (emphasis added).
- 10 “Michael Gove vows to take action on ocean plastic after being ‘haunted’ by Blue Planet,” Helena Horton, *The Telegraph* (November 21, 2017) available at <https://www.telegraph.co.uk/news/2017/11/21/michael-gove-vows-take-action-ocean-plastic-haunted-blue-planet/>
- 11 Available at <https://www.youtube.com/watch?v=ArYLGNe-jCA>. As of March 1, 2019, the clip has been viewed over 569,000 times
- 12 *The New Plastics Economy: Rethinking the future of plastics*, World Economic Forum (January 2016) at pp 7. Available at http://www3.weforum.org/docs/WEF_The_New_Plastics_Economy.pdf
- 13 “Plastic waste inputs from land into the ocean,” J. Jambeck, et al., *Science* (February 13, 2015). Available at <http://science.sciencemag.org/content/347/6223/768.full>
- 14 *What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050*, Kaza, et al., World Bank (2018) at pp 3. Available at <https://openknowledge.worldbank.org/bitstream/handle/10986/30317/9781464813290.pdf>
- 15 *Stemming the Tide: Land-based strategies for a plastic-free ocean*, Ocean Conservancy (2015) at pp 3. Available at <https://oceanconservancy.org/trash-free-seas/take-deep-dive/stemming-the-tide/>
- 16 *Meeting Asia’s Infrastructure Needs*, ADB (February 2017) available at <https://www.adb.org/publications/asia-infrastructure-needs>
- 17 *Closing the Financing Gap: Infrastructure Project Bankability in Asia*, Oliver Wyman (Marsh & McLennan Companies 2017). Available at https://www.oliverwyman.com/content/dam/oliver-wyman/v2/publications/2017/jun/Closing_The_Financing_Gap_Infrastructure_Project_Bankability_In_Asia.pdf
- 18 Id., at pp 17 (referencing *Infrastructure Investment, Private Finance, and Institutional Investors: Asia from a Global Perspective*, G. Inderst, ADB (2016).
- 19 Id., at pp 19.
- 20 Id., at pp 15.
- 21 *Better Finance, Better World*, Blended Finance Task Force (2018) at pp 80. Available at <https://www.blendedfinance.earth/working-papers>
- 22 Supra at pp 14.
- 23 *The Next Wave: Investment Strategies for Plastic Free Seas*, Ocean Conservancy (2017). Available at <https://oceanconservancy.org/wp-content/uploads/2017/05/the-next-wave.pdf>
- 24 A full list of the Closed Loop Ocean initiative funders is set out in Appendix C.



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Endnotes (cont'd)

- 25 See, e.g., Sea of Opportunity: Supply Chain Investment Opportunities to Address Marine Plastic Pollution, E. Moss, et al., Encourage Capital on behalf of Vulcan, Inc., (February 2017). Available at <http://plasticreport.vulcan.com/#/> at pp 8 (“[T]here is no single solution to th[e] problem [of ocean plastics]”).
- 26 Investments in solutions prior to plastic becoming waste for collection and management, while essential to a portfolio intervention approach, are therefore outside the scope of the handbook. Such interventions include: the accelerated scaling and development of bio-benign or more readily recyclable materials, and innovative products and circular economy business models (See Sea of Opportunity at pp 8-11).
- 27 See, e.g., Jambeck supra ranking Indonesia, the Philippines, Vietnam and Thailand as the second, third, fourth and sixth nations, respectively, by annual total of mismanaged marine debris; See also, “Export of Plastic Debris by Rivers into the Sea,” C. Schmidt, et al., *Environmental Science & Technology* 2017, 51, 12246-12253 (identifying the Ganges as one of the Top 10 rivers globally that contribute to mismanaged plastic waste).
- 28 See, e.g., Footnotes 15, 23 and 25.
- 29 <https://www.worldbank.org/en/country/mic/overview#2>
- 30 See, e.g., What a Waste 2.0 at pp 88 (“Typical challenges that have repeatedly been identified in World Bank studies include ... [a s]hortage of financial resources, particularly to operate waste collection, transport, and disposal systems, caused by lack of revenues from households and other waste generators or lack of budget and funding in local governments”).
- 31 Id. at pp xii.
- 32 See, e.g., Indonesia Marine Debris Hotspot Synthesis Report, World Bank (April 2018) at pp 4 (“There is virtually no enforcement of solid waste laws and standards (from city-level violations to individual polluters”).
- 33 Waste of a Nation at pp 207.
- 34 See, e.g., Aavishkaar’s investment in NEPRA-Let’s Recycle on pp 44.
- 35 Available at <http://www.oecd.org/env/tools-evaluation/extendedproducerresponsibility.htm>
- 36 What a Waste 2.0 at pp 109.
- 37 Interview with Waste Ventures India, Hyderabad (February 21, 2018).
- 38 See, e.g., <https://www.gemrecycling.com/> and <https://www.india-recycling.com/>
- 39 “KKR steps up India presence with stake in Ramky Enviro,” Henny Sender, *The Financial Times* (August 12, 2018) available at <https://www.ft.com/content/6706d186-9e11-11e8-85da-eeb7a9ce36e4>
- 40 “Sustainable Waste Management and Waste to Energy Recovery in Thailand,” Warangkana Jutidamrongphan (2018) available at <http://dx.doi.org/10.5772/intechopen.74988>
- 41 “Why the world’s recycling system stopped working,” L. Hook and J. Reed, *Financial Times* (October 25, 2018). Available at <https://www.ft.com/content/360e2524-d71a-11e8-a854-33d6f82e62f8>
- 42 “Chinese firms look abroad to skirt import policies,” C. Staub, *Resource Recycling* (January 3, 2018) available at <https://resource-recycling.com/recycling/2018/01/03/chinese-firms-look-abroad-skirt-import-policies/>
- 43 “China’s plastic recyclers go abroad as import ban bites,” D. Stanway, *Reuters* (June 26, 2018) available at <https://www.reuters.com/article/us-china-pollution-waste/chinas-plastic-recyclers-go-abroad-as-import-ban-bites-idUSKBN1JM0L9>
- 44 “Thailand to ban foreign plastic waste from 2021,” J. Reed, *Financial Times* (October 14, 2018). Available at <https://www.ft.com/content/06b5a136-ce09-11e8-b276-b9069bde0956>
- 45 Landscape for Impact Investing at pp 46-53.
- 46 Id., at pp 100-101.
- 47 The Next Wave at pp 46 (emphasis added).
- 48 The Next Wave at pp 72.
- 49 Waste of a Nation at pp 182.
- 50 GA Circular, *Study of Plastic Leakage in Jakarta* (presented at Our Ocean Conference, October 29-30, 2018).
- 51 What a Waste 2.0 at pp 110.
- 52 There are novel ways to address certain risks. For example, one project in the Philippines has sought to address risk in feedstock supply by establishing a pre-



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Endnotes (cont'd)

funded escrow account with its supplier. If the supplier fails to meet its plastic tonnage obligation, a financial penalty to be paid from the escrow account is due. But, if it exceeds its plastic tonnage obligation, it shares a portion of the revenues from the sale of the resulting product: a 'stick-and-carrot' approach.

53 The risks discussed in this section comprise examples of the wide variety of risks confronting investors in emerging markets and do not purport, in any way, to be an exhaustive or comprehensive discussion of inherent risks

54 Annual Report on Exchange Arrangements and Exchange Restrictions, IMF (April 2018) available at <https://www.imf.org/en/Publications/Annual-Report-on-Exchange-Arrangements-and-Exchange-Restrictions/Issues/2018/08/10/Annual-Report-on-Exchange-Arrangements-and-Exchange-Restrictions-2017-44930>

55 See, e.g., <https://www.tcxfund.com/>

56 Political Risk Map 2018 available at <https://www.marsh.com/content/marsh/political-risk-map-d3/prm-2018.html#> (accessed on November 1, 2018).

57 The Financial Times Lexicon defines political risk as "the risk of operating or investing in a country where political changes may have an adverse impact on earnings or returns. This concerns not only politically unstable countries, but also places where normal democratic procedures may bring about a change of government and thus a possible negative change in policy, for example, on tax, regulatory constraints and tariffs, etc." Available at <http://lexicon.ft.com/Term?term=political-risk>

58 See Appendix A

59 "Status and challenges of municipal solid waste management in India: A review," Rajkumar Joshi & Sirajuddin Ahmed, Cogent Environmental Science (2016) at pp 5

60 "Recovery of consumer waste in India – A mass flow analysis for paper, plastic and glass and the contribution of households and the informal sector," B. Nandy, et al., Resources, Conservation and Recycling 101, 167-181 (2015)

61 "Plastic packaging the sustainable and smarter choice: Why banning plastic packaging in India is not a viable option," Strategy & and FICCI (PwC, 2015) at pp 3. Available at <http://fikki.in/spdocument/20573/Plastic-Packaging-the-sustainable-and-smarter-choice.PDF>

62 Confederation of Indian Industry (www.cii.in)

63 Having imposed the registration requirement on producers only, the Plastic Waste Management Rules were subsequently amended, in 2018, to require the registration of brand owners as well.

64 Id., Section 2

65 Id., Section 4

66 Section 3(h), definition of Extended Producer Responsibility

67 Or, the Central Pollution Control Board if it operates in more than two states or union territories.

68 Toward Circularity of Post-Consumer Flexible Packaging in Asia: Exploring collection and recycling solutions, GA Circular and Amcor (November 2017) at pp 30, 33. Available at <https://www.gacircular.com/publications>.

69 Supra at Footnote 37.

70 Maharashtra Plastics and Thermocol Products Notification, 2018 available at http://mpcb.gov.in/images/pdf/plastic_27032018.pdf

71 "Private Equity and India's Economic Development," Rohit Kapur, et al. (McKinsey & Co., August 2015). Available at <https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/private-equity-and-indias-economic-development>

72 Social Accountability International's Social Fingerprint® program that is designed to help companies understand and measure their social impact, and how to improve it. Available at <http://www.sa-intl.org/index.cfm>

73 "India recycles 90% of its PET waste, outperforms Japan, Europe and US: Study," Hindustan Times (February 19, 2017) available at <https://www.hindustantimes.com/mumbai-news/india-recycles-90-of-its-pet-waste-outperforms-japan-europe-and-us-study/story-yqphS1w2GdlwMYPgPtyb2L.html>

74 See Footnote 52.

75 Law No. 18/2008 on Waste Management. Available at <https://www.ecolex.org/details/legislation/law-no-182008-regarding-rubbish-management-lex-faoc084136/>

76 Law No. 32/2009 on Environmental Protection and Management. Available at <https://www.ecolex.org/details/>



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Endnotes (cont'd)

[legislation/law-no-322009-on-environmental-protection-and-management-lex-faoc097643/](#) (Art.1.23 defines management of hazardous and toxic waste as comprising the “reduction, storage, collection, transportation, use, treatment and/or landfill” thereof).

77 See, e.g., [Indonesia Marine Debris Hotspot Synthesis Report](#), World Bank (April 2018) at pp 9 (“Although the ministries offer sectoral linkages across departments, persistent overlaps in their roles and responsibilities adversely effect efficiency and effectiveness of execution of mandates and institutional responsibilities”).

78 Available at <https://maritim.go.id/konten/indonesias-plan-action-marine-plastic-debris-2017-2025/>

79 Law No. 18/2008, Art. 9.

80 Id., Art. 15

81 “Managing Policy of Extended Producer Responsibility Implementation to reduce plastic waste in Indonesia,” Enis Tristiana, et al. (Faculty of Law, University of Brawijaya), *International journal of Humanities and Social Science Invention (IJHSSI)*, Vol. 7, No. 07, pp25-32

82 [Landscape for Impact Investing](#) at pp 104-5.

83 [Hotspot](#) at pp 20.

84 See, generally, Footnote 68.

85 See, e.g., Footnote 50 (estimating the PET recycling rate in DKI Jakarta at 69 percent).

86 The cities are DKI Jakarta, Tangerang, Bandung, Semarang, Surakarta, Surabaya, Makassar, South Tangerang, Bekasi, Denpasar, Palembang and Manado.

87 [Toward Circularity of Post-Consumer Flexible Packaging in Asia](#) at pp 18.

88 [Hotspot](#) at pp 1.

89 Id.

90 Coincidentally, analysts point to both the mayor of Surabaya, Tri Rismaharini, popularly known as Ibu Risma, and the former mayor of Bandung, Ridwan Kamil, now the governor of West Java, as potential local champions of investment in SWM.

91 Available at https://www.bi.go.id/en/peraturan/moneter/Pages/pbi_162114.aspx

92 See Footnote 52.

93 “Indonesia’s president unscathed by currency woes,” *Financial Times Confidential Research*, October 18, 2018. Available at <https://www.ft.com/content/b5e08120-d2c9-11e8-a9f2-7574db66bcd5>

94 [Hotspot](#) at pp 3.

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circulatecapital.com
hello@circulatecapital.com



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