

# ENVIRONMENTAL SERVICES

## UNDERSTANDING THE INVESTMENT FUNDAMENTALS OF THE ENVIRONMENTAL SERVICES SECTOR

By Alan Lok, CFA; Eunice Chu, ACCA; and Guruprasad Jambunathan, FRM

What do tackling climate change and succeeding in investing in risk assets over a longer term have in common? The answer: Our brains haven't evolved to deal with either. We are hardwired to be short-term thinkers. Our hominid minds remain the same as those of our ancestors. Primed to be alert for imminent threats, we don't have the fully refined instincts to respond to dangers looming in the future (maybe check back in a few million years).

Then there's the emotional factor. Spotting a wolf pacing around the edge of the forest triggered a rush of fear so intense that our forefathers sprinted away. No higher-level prefrontal cortex thinking was required. Our emotions are best adapted for life as once lived.

Our technological and societal progress has since raced past our evolutionary environment, and we haven't had time to catch up. The pitfalls of our biological tendency towards short-term thinking and emotional are well-known in the investment community – a common trait being missing out on gains from long-term investing.

Such parallels can easily be seen in how we think about climate change and environmental issues in general.

### AN IMPORTANT YET UNINSPIRING ISSUE

Despite the doubtless passion of activists like Greta Thunberg, who protested outside the Swedish parliament at the age of 15 and started the international "school strike for climate" movement, the fact is, change in weather patterns does not trigger strong emotions. As we have observed, any long-term scenario won't necessarily spark immediate emotions in our brains.

Fortunately, however, our awareness is increasing, with 97% of climate scientists agreeing that temperatures are moving higher. Governments and corporations are increasingly taking measures to help preserve the environment. Perhaps there is hope for us yet.

### STUDYING THE INVESTMENT CLIMATE

However, we are not here to preach from a pulpit. You see, this growing awareness of climate change and environmental issues also creates corresponding investment opportunities.

Consider the two subsectors we will focus on: solid waste management and recovery/recycling. Solid waste management is the traditional staple of the broader sector – a must for the modern metropolis. In 2017, the industry was worth US\$330 billion. By 2025, this figure is estimated to reach US\$530 billion. In recent years, the proper disposal of pollutants has come to the fore. Indeed, the recycling market was valued at around US\$265 billion in 2017, and is forecast to reach US\$377 billion by 2024.

Taken together, that's close to a trillion-dollar industry in under a decade. It might seem surprisingly high until you consider that the world's cities generated over 2 billion tonnes of solid waste in 2016, a figure expected to hit almost 3.5 billion tonnes by 2050.

So, rather than be overly pious, we will instead give you a systematic framework for analysing this valuable, growing, and indispensable sector.

We will begin by helping you to understand how the industry is defined.

### DEFINING AND CATEGORISING THE INDUSTRY

Unlike the previous industries we have explored, there is no clear consensus on the boundaries of what are environmental services. Depending on who you ask, subsets like pollution control, water treatment, and environmental services engineering may also be included.

Whatever these confines are, both solid waste management and recovery and recycling are well within them, which is why they form the centrepiece of our sector analysis.

The first step is to categorise these two subsectors. Within the solid waste management segment, determine the type of waste a company handles. It might be municipal solid waste (MSW), better known as rubbish/trash/garbage – industrial, hazardous, agricultural, biomedical, or a combination of these. Remember that regulations vary by type of solid waste. On the service level, research what the company offers: Does it cover the full spectrum of collection, aggregation, transfer, storage, and disposal, or just part of it?

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If a company is in the recovery and recycling space, again, look at the type of excess it deals with – for example, plastics, construction debris, e-waste, or organic waste. You should pay particular attention if it handles e-waste or hazardous materials, as it typically means heavier regulatory scrutiny.

Within such assessments, establish the firm's end customers for each of its services. Also, keep in mind that since solid waste management and recovery and recycling can be linked in a single end-to-end process, you may find some companies which straddle both these areas. Because of this possible interlinking, both subsectors have many demand drivers in common.

## THE DEMAND EQUATION

The top-line demand equation is simple: The more waste generated, the higher the need for environmental services. While the drivers may be similar across markets, there might be different growth factors for the various types of excess. Study what may be causing an upturn in waste generation in a company's markets split by category. Then, examine how they would affect the demand for a firm's specific services.

Beyond the amount of waste created in an individual market, you must also take population and regulatory sentiment into account. What is the general public's view on environmental issues? Do they take personal responsibility, or do attitudes lean more towards relegating responsibility solely to the government?

On the political and regulatory side, examine where the company's operating facilities are located and what jurisdictions they cover. Investigate whether each relevant government prioritises sustainable waste generation and management. See if it has enacted policies such as mandatory disclosure on emissions, and environmental, health, and safety (EHS) spending. Remember, talk is cheap. What matters is if a country's politicians have the will to implement and enforce long-term plans that may inconvenience the populace in the short run.

## GRASPING MARKET STRUCTURE

Market structure also varies. Starting with the regulatory landscape, find out what kind of controls apply to the industry. Since we're talking about solid waste and recycling, look up the rules on landfill, importation, and transportation. With regard to landfill, review aspects such as closure and post-closure requirements as well as capacity rules.

From a competitive perspective, assess how regulations could turn a market's barriers to entry. Is it difficult, expensive, or time-consuming to obtain the necessary approvals and permits? Capital requirements are another roadblock, so measure the amount of investment typically required.

Then there's the competition. Ascertain the market share of the top three or five players in the industry. Are you looking at an oligopolistic market, or is it more competitive? In such a capital-intensive and regulation-heavy industry, large and entrenched competition may prove an insurmountable barrier.

## FINANCIAL AND OPERATIONAL MEASURES

Moving on, start with the standard financial inquiries. Review revenue growth and gross, operating, and net margins, as well as free cash flow metrics, not forgetting to benchmark these against peers. Split these metrics according to the waste profile and type of services offered by the company for a more detailed picture of its financial performance. For instance, solid waste managers may use several disposal methods – incineration, recycling, and third-party removal, among others. How much revenue and profit does each method generate?

Operational metrics differ depending on the company's subsector. For solid waste management businesses, learn about growth trends in the number of customers served and volume of waste managed. For recycling and recovery firms, look at growth trends in recycled materials, the recovery rate of recyclates, as well as unit prices. For both types of companies, probe into whether they have any advantage, whether technological, regulatory, or otherwise, that may give them an edge over their competition.

## ENVIRONMENTAL, SOCIAL, AND GOVERNANCE FACTORS

In many ways, environmental, social, and governance (ESG) initiatives by firms in other sectors are the environmental services industry's rice bowl. The growing trend of stricter ESG regulations around the world as a result of increasing environmental awareness is thus a boon.

This does not mean the sector itself is spared from ESG scrutiny. In fact, environmentally focused companies should come under heavier inspection (and they usually are). First, gauge the footprint of the business: What is its track record in reducing energy and emissions intensity? Given the nature of the industry, this is likely directly linked to its operating model (i.e., its primary disposal methods).

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Have there been any incidents of leakages or accidents resulting in environmental damage? What about corruption and kickbacks in winning projects and measures in preventing such practices (recall that in the United States, the mob was once heavily involved in the garbage collection business)? Don't forget to explore the company's track record on the fair treatment and safety of its workers.

## THE LONG-TERM DEMAND CLIMATE

Given that people tend to falsely conflate the weather (short-term) with the climate (long-term), we cannot afford to neglect the bigger picture when analysing this industry. On a general level, survey population growth, consumption, and urbanisation trends to visualise the future. Study per capita waste generation figures and the correlation between economic growth and waste generation in individual markets.

Zooming in a little, inspect the GDP share of industries which generate a high volume of waste. This includes manufacturing, agriculture, thermal power generation, and mining. What are their projected growth trends? Finally, bear in mind the impact of technology – size up how clean production technologies might evolve and the effects they might have.

In terms of glamour, a study of solid waste management and recycling companies can't be compared to a review of, say, the luxury goods sector, but it is a necessary and growing space with real investment opportunities. So, eschew your city shoes, don a pair of rubber boots, and get stuck in!

## About the Authors

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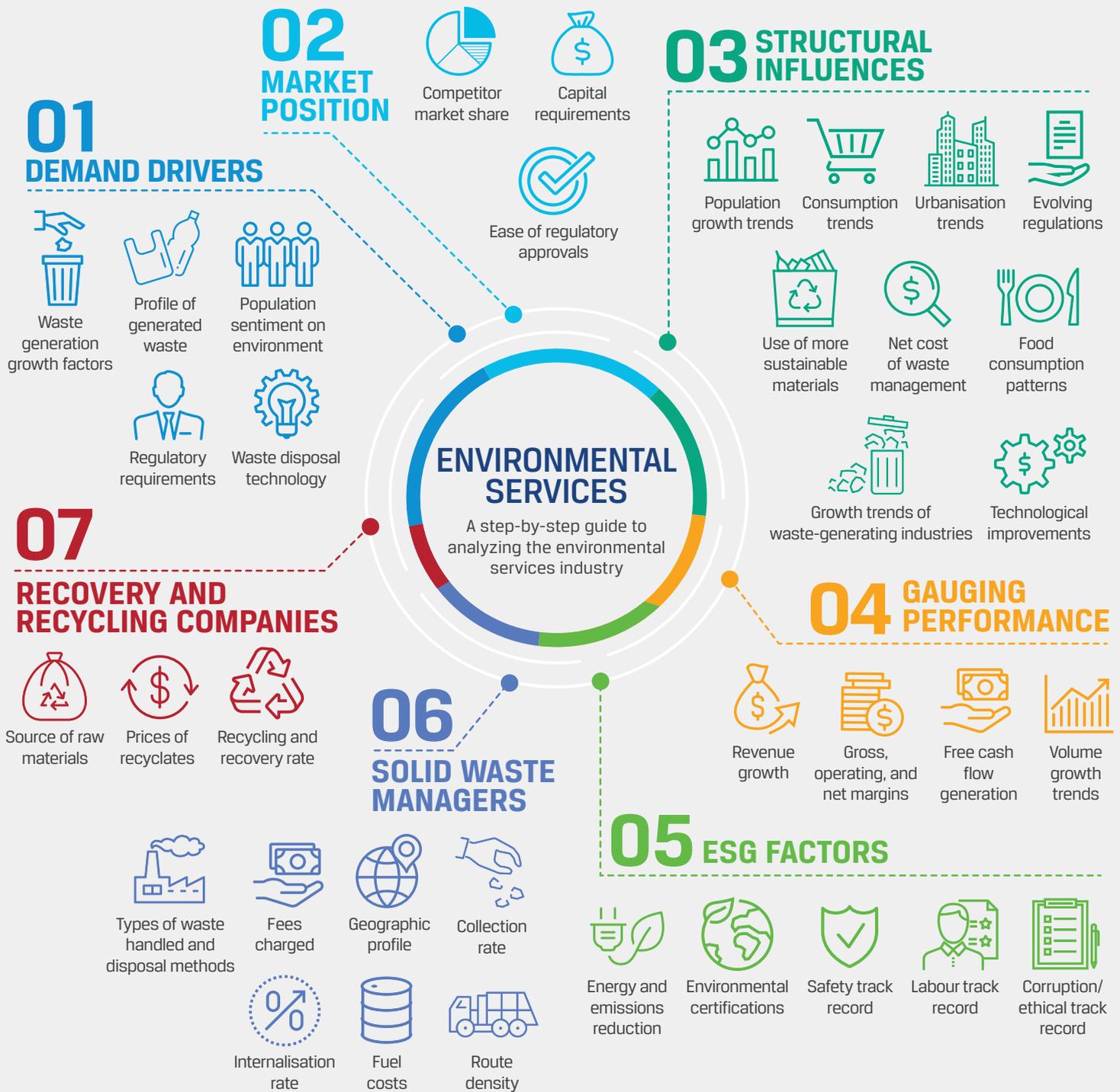
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## Common to the sector

### 1. DD: What are the services provided by the company?

- What are the various services provided by the company: waste collection, aggregation, transportation, disposal, recovery, recycling, waste to energy, safe storage etc.?
- What are the types of waste dealt with, by potential for environmental impact: municipal solid waste (MSW), hazardous waste, non-hazardous, biomedical waste, E-waste etc.?
- What are the services provided by the company, by method of disposal: composting, recycling, incineration, compacting, dumping in landfills, safe storage etc.?
- Does the company handle both organic and inorganic waste?
- Which are the end markets served, by the originator of waste: household, commercial, municipal governmental, industrial, biomedical etc.?
- Does the company offer clean production solutions aimed at waste reduction and pollution control?
- Does the company provide environmental protection and remediation services?

### 2. DD: What are the drivers of demand for environmental services?

- What are the factors causing growth in waste generation?
- How is the profile of waste generated evolving: proportion of organic waste is increasing, more non-biodegradable waste is generated, more hazardous waste is generated etc.?
- How aware, sensitive and active is the population about environmental issues in general?
- How does the population view the impact of unsustainable waste generation and management practices?
- How do differences in technology (between methods of disposal, between countries, and over time) influence the supply conditions in the industry?

### 3. DD: What is the profile of consumers?

- Who are the consumers for the various services?
- What is the mix of revenues and profits by various services and consumer types?

### 4. DD: What are the regulatory factors driving demand for environmental services?

- What are the details of emissions and waste generation that businesses and industries are required to disclose about with their operations?
- Are there any mandates or disclosure requirements on EHS spending by businesses and industries?
- What is the extent of Environmental, health and safety (EHS) spending by households, businesses, industries and the government?
- How strong is the enforcement of various regulations governing waste management?

### 5. SI: What are the structural factors influencing demand in the company's key markets?

- What are the trends in population growth, consumption and urbanization?
- How many mega cities exist in the company's key markets? How many are expected to be there in future?
- What is the per capita generation of different types of waste?
- What is the correlation between economic growth and waste generation intensity?
- How does the net cost (after recovering useful material and energy) of waste management compare with the per capita GDP and income levels?

### 6. SI: What are the changes in patterns of food consumption that drive increase in generation of packaging waste?

- Is the share of processed, packaged, ready to cook and ready to eat foods in the total food consumption increasing?
- How does the growth in meal take-away and delivery services compare with the growth in total food consumption?
- Which materials are used for food packaging currently? Is there a shift to using more biodegradable or recyclable material?
- What is the share of food waste in the total amount of waste generated?

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## 7. SI: What are the cultural and behavioural factors influencing the business?

- How does the population view the issues of cleanliness and waste management?
- Do people consider waste management as a shared responsibility or as the responsibility of government/civic bodies or private entities?
- Do practices of source segregation and decentralised management of waste get support from consumers?
- How strong is the Not In My Backyard sentiment? Do the communities near existing or proposed waste management facilities and landfills strongly oppose locating such facilities close to their neighbourhoods?
- Are there informal networks of waste collectors and handlers? What are the details of efforts made at professionalising and formalising those networks? Are there moves to partner them for the larger goal of responsible and sustainable waste management?

## 8. SI: What is the role of technology in the waste management business?

- Which parts of the waste management ecosystem does the company see significant role for technology-enabled solutions (waste reduction, collection, sorting, processing etc.)?
- What are the details of any initiatives the company has taken to leverage technology in its operations?

## 9. MP: What is the level of market concentration and barriers to entry?

- What is the market share of Top 3 / Top 5 waste management service providers?
- How difficult, expensive and time consuming is it to get the requisite approvals and permits?
- What is the typical capital investments needed to serve a certain size of customers?
- Does the company possess any unique technology or processes that gives it an edge over competition?

## 10. MP: What are the environmental, public health and safety related challenges and regulations related with landfills and other waste management facilities?

- How does the current capacity of landfills compare with current and future requirements?
- What are the legal and regulatory requirements governing the siting and running of landfills?
- What are the liner and leachate collection and removal requirements governing landfills and other facilities?
- What are the requirements regarding monitoring of groundwater near landfills and other facilities?
- What are the closure and post-closure requirements?
- What are the hazards posed by natural disasters such as cyclones, earthquakes, floods and earthquakes?

## 11. MP: Where are the company's waste management facilities located? What are the geographical restrictions on the movement of waste?

- How are the company's facilities connected to the transportation infrastructure necessary to receive waste collected and despatched from the generating points?
- Do the company's facilities treat waste collected from generators in the same jurisdiction (region or country) or from foreign jurisdictions?
- How much of the waste managed by the company is imported from other jurisdictions?
- What is the legal, political and public perception of such import of waste? Are there any proposals under consideration to restrict or prohibit such imports?
- What are the various restrictions and regulations governing transportation and transfer of solid waste?

## 12. PM: How has been the company's performance on financial measures? How does that compare with peers and expected to evolve?

- What has been the revenue growth of the company?
- What has been the gross, operating and net margins?
- How much free cash flow the company generates, as a percentage of revenues?

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## Solid Waste Managers

### 13. DD: What are the various types of MSW handled by the company?

- What is the mix of amount waste handled by different types: hazardous vs non-hazardous, municipal vs industrial vs biomedical, organic vs inorganic, corrosive, toxic, radioactive etc.?
- What are the various services offered by the company: collection, aggregation, transfer, storage, disposal?

### 14. DD: What are the details of MSW handled by the company?

- Does the company offer end-to-end services or operates in parts of the chain?
- What is the geographic profile of the markets served by the company: urban, semi-urban or rural?
- What is the collection rate (waste collected as a percentage of waste generated) in the areas where the company operates?

### 15. DD: What are various disposal methods of MSW used by the company? How much revenue is generated from each method?

- What proportion of the waste collected is disposed in different ways: compacted and dumped in landfills, composted, recycled, incinerated or sold to third parties for further processing?
- What is the fee charged by the company for waste collection, aggregation and transfer, per unit of waste?
- What is the rate of tipping / gate fee charged by the company at its landfills?

### 16. DD: What are the details of industrial solid waste handled by the company?

- What are the different types of industrial waste handled by the company: organic vs inorganic, hazardous vs non-hazardous etc.?
- What is the profile of the hazardous waste: toxic, flammable, corrosive, radioactive, explosive etc.?
- How is the waste material collected?
- Which are the industries the generators of solid waste operate in: oil & gas, chemicals, farm inputs, metals and mining, pharma etc.?
- What are the disposal methods used: underground injection, landfill and treatment, incineration, composting, dumping and incineration at sea?

### 17. SI: What are the structural factors influencing the solid waste management business?

- What is the share of process and manufacturing industries in the GDP of countries where the company operates? How is this evolving?
- What is the current state and prospects of industries such as nuclear power generation, electronic manufacturing, solar panel manufacturing, chemicals, pharma etc., that generate high levels of hazardous solid waste?
- What are the growth trends of industries such as agriculture, thermal power generation, mining, quarrying etc. that generate high levels of non-hazardous solid waste?
- How are clean production technologies evolving? How is that likely to affect waste generation intensity?

### 18. MP: What is the regulatory structure of the solid waste management industry?

- Which agency regulates the activity?
- How many licences / contracts are granted in each area for MSW collection and handling?
- How are the licences / contracts granted and for how long?
- What is the typical duration of the contracts that the company holds?
- In case of multiple licences, how many service providers does the company compete with? Is there overlap in areas served?
- Does the company have exclusive licences / contracts in any areas?
- What is the revenue sharing arrangement with the contracting agencies?
- Does the company own the landfill sites or depends on others?
- What are the regulations governing charging of tipping / gate fee? How is it determined?

### 19. PM: How has been the company's performance on operational measures? How does that compare with peers and expected to evolve?

- What has been growth trends in the number of customers served and volume of waste managed?
- How close to each other are the waste generators located?
- What is the route density (tonnes of waste collected per km of collection route) of the company's collection operations?
- What has been the internalization rate (percentage of waste disposed in own landfills) of the company?
- How has average waste handling charges per unit evolved?
- What is the share of fuel costs as a percentage of total costs and revenues?

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## Recovery and Recycling Services

### 20.DD: What are the details of industrial solid waste handled by the company?

- What are the different types of waste from which the company recovers material or recycles: plastics, construction debris, e-waste, organic and food waste etc.?
- Does the company recycle both hazardous and non-hazardous waste?
- Where, how and in what quantities are these wastes generated?
- How is the raw waste material sourced? Is it sourced locally, domestically or imported from foreign countries? Does the company collect them directly from generators or buys from other companies which collect from generators?

### 21. DD: What are the factors influencing supply of raw material for recycling and recovery?

- What are the trends in generation of different materials that the company uses as raw material for recycling and recovery?
- What are the regulatory, consumption or technology driven factors affecting generation of waste used by the company?
- How are technological advancements like single- and dual-stream recycling, co-mingled recycling and all-in-one mixed-waste processing driving demand by reducing need for segregation at source by the generator of waste?
- What is the likely result of increasing adoption of sustainable building materials and reduction of waste at construction site, driven by the Leadership in Energy and Environmental Design (LEED) framework of the United States Green Building Council (USGBC)?

### 22.DD: What are the factors driving demand for material recovery recycling services?

- What are the legislative, regulatory or voluntarily adopted mandates for use of material such as recycled paper and packaging and post-consumer plastics?
- What are the regulations governing recovery or reuse of demolition and construction debris?
- What are the evolving consumer preferences that are driving demand for recycling services?

### 23.DD: What are the factors driving demand for waste to energy generation services?

- What is the share of biogenic (food and farm waste) waste in the total waste generated?
- What is the heat content of the typical kinds of non-biogenic (e.g. plastics and metals) waste generated?

- What drives demand for waste to energy services: paucity of suitable land fill sites due to growing waste volumes and competing land uses, sustainability issues surrounding landfilling, leakage from landfills and resultant impact on the environment, methane gas emissions from landfills etc.?

### 24.DD: Does the company handles e-waste?

- What factors drives availability and collection of e-waste? Are there mandates for electronic device makers to offer collection services to end users?
- What is the impact of the increasing penetration and shortening upgrade cycles of electronic gadgets on generation of e-waste?
- How does the company sources e-waste?
- Does the company refurbishes previously used electronic equipment and resells them?
- How does the company ensure all user data in the devices are erased before reselling?
- Where refurbishing is not feasible, what are the various material does the company recovers?

### 25.DD: What are the prices of recyclates?

- How does the price of energy generated from waste compares with energy from various other sources?
- What are the prices realised for various recyclates (such as fuel and polyester yarn from plastic waste, precious metals from e-waste etc.) produced by the company?
- How much prices do refurbished electronic devices command?

### 26.SI: What is the recycling and recovery rate in the company's key markets?

- What proportion of different types of waste are recycled / recovered (recycling rate)?
- How does the recycling rate in the areas where the company operates compare with national, regional and global trends?
- How does the company expect the recycling rate to evolve?

### 27. PM: How has been the company's performance on operational measures? How does that compare with peers and expected to evolve?

- What has been growth trends in the volume of material recycled by the company?
- What has been the recovery rate of recyclates from raw waste, for different types of waste?
- How have the unit prices of recyclates and energy evolved?

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## Environmental, Society and Governance

### 28. What are the company's ESG principles, practice and track record?

- a. What is the company's strategy, practices and track record in reducing the energy intensity, water intensity, emissions intensity, waste generation and overall environmental and ecological footprint of the services and operations?
- b. What are the steps taken by the company to promote sustainable practices by waste generators?
- c. What proportion of the sites operated by the company have environmental management certification such as ISO 14001?
- d. How many incidents of leakages or other accidents resulting in damage to the environment has the company faced? What are the details and consequences of such incidents?
- e. What is the proportion of total work sub-contracted or outsourced? What is proportion of total number of personnel employed and revenue generated?
- f. How has been the company's track record regarding the safety and fair treatment of labourers involved in its projects? What is the total number of fatalities, days lost and injuries in relation to total number of personnel employed?
- g. How much is the typical spend on maintenance and safety at the company's offices and project sites?
- h. Has the company faced accusations of indulging in corruption and offering kickbacks to win projects?
- i. What measures does the company undertakes to prevent corruption and bribery in the context of contracting with public organisations and governments?
- j. What is the company's policy and track record relating to political donations?