

White Paper:
Waste Management in the time of COVID-19
MAY 2020

Preamble

After the initial shock that rippled through the world as the COVID-19 virus spread on a global scale by mid-January 2020, shortcomings started to come to the fore. One thing became clear and that is that most countries seemed unprepared to deal with major pandemics. Hospitals and healthcare facilities happened to be understaffed and ill-equipped in most of the Western world, economies struggled to devise backup plans to address lockdowns, and people, especially living in democracies, were not ready to adapt and/or accept the ‘imposed’ social distancing and other necessary measures to deal with the pandemic. The economic impacts have been dire.

Some early estimates from the IMF set the costs to global economies at \$9t over the next 2 years. Global economies are expected to contract in average 3% over 2020. Individual regional growths were also slashed, particularly for Asia to 2.2% from 5.5% estimated in September last year. China’s forecast was slashed to 2.3%, over half from the estimated 6% last year.

Some industries such as tourism, transport, entertainment, and hospitality will be highly affected. For instance, the Center for Aviation CAPA, is expecting that by the end of May-2020, most airlines in the world will be bankrupt unless a serious government back-up is initiated. As of April 2020, the airline industry is seeking more than \$50b in government aid. On the 1st of May, United Aviation produced a report on the economic impact of the pandemic on the airline industry standing between \$153b and \$273b in loss of gross operating revenues. To give a relative comparison, after 9/11, one of the world’s most catastrophic event for the airline industry, revenues fell by “only” \$23b, nowhere near the COVID-19 forecasted implications. Governments are actively looking at bailing out the industry, for instance, a debt deal was recently arranged for Boeing and the EU approved a rescue package for Air France/KLM.

However, other industries such as healthcare, pharmaceuticals and waste management (WM) can expect to be spared the brunt of such economic downturns. Companies operating in these sectors, that understand how to adapt and adjust, and that are equipped and prepared, or that can initiate new opportunistic services, could tremendously benefit during and in the aftermath of the pandemic.

In some respect ‘Healthcare’ and ‘WM’ services become intertwined especially in the areas of treatment and disposal. As COVID-19 is continuing to spread and its impacts upon human health and the economy is intensifying by the day, governments are urged by international organizations such as the WHO to treat waste, including medical, household and other hazardous waste, as an urgent and essential public service in order to minimize possible secondary impacts upon health and the environment.

WM Industry Pre-COVID-19

The highest producing sector of WM pre COVID-19 was the solid waste (SW) segment which stood at \$1t in 2019 with annual capacity anticipated to exceed 28 billion tons by 2026. Growing urbanization along with a steady increase in the global population had ticked up the implementation of SW processes.

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The industrial SW sector was expected to register over 2.3% CAGR from 2020 to 2026, driven by the introduction of stringent ecological standards and mandates. Rapid industrialization across developing economies along with efforts to attain a sustainable growth would drive the demand for effective WM practices.

The municipal SW sector capacity was set to reach 2 billion tons by 2026, and demand across the residential sector would witness significant gains on account of the ongoing urbanization along with increasing consumer spending toward manufactured goods.

When looking forward, daily per capita waste generation in high-income countries was projected to increase by 19% by 2050, compared to low- and middle-income countries where it was expected to increase by approximately 40%. The total quantity of waste generated in low-income countries was expected to increase by more than 3x by 2050. The East Asia and Pacific region was generating most of the world's waste, at 23%, and the MENA region was producing the least in absolute terms, at 6%. However, the fastest growing region for the forecasted period was MENA, where, by 2050, total waste generation was expected to more than double.

The New Landscape: Medical & Hazardous Waste

Pre COVID-19, the volume of medical waste sector stood at \$11.77b in 2018 and was expected to reach \$17.89b by the year 2026, at a CAGR of 5.3%. Key factors behind such high CAGR included: (a) the rise in elderly population, (b) the development of advanced manufacturing techniques for medical and drugs equipment, (c) the increased initiatives by governments towards developing the healthcare infrastructure across the world, (d) the increase in healthcare expenditures and; (e) the rise in awareness regarding medical waste.

The latest data in 2018, showed that the hazardous waste sectors was expected to grow at CAGR 8% p.a. to 2022. It grew by 5.98% y-o-y in 2018. This growth was attributed to the growth of industrial waste which produces large quantities of hazardous waste. With the advent of COVID-19, the sector is anticipated to witness a significant growth in the coming years, as discussed below.

Across the world, out of the total amount of waste generated by healthcare activities, about 85% is general waste and the remaining 15% is considered 'hazardous' meaning that it may be infectious, toxic or radioactive. Infectious and anatomic wastes together represent the majority of the hazardous waste, up to 15% of the total waste from healthcare activities. Chemicals and pharmaceuticals account for about 3% while gene toxic waste, radioactive matter and heavy metal content account for around 1% of the total healthcare waste volume.

According to the American Hospital Association in 2015 on waste prevention and management in hospitals, 5,000 acute care hospitals in the U.S. generate around 7,000 tons of waste every day and spend \$10b annually on its disposal.

During an outbreak such as COVID-19, many types of additional medical and hazardous wastes are generated, including infected masks, gloves and other personal protective equipment (PPE), together with a higher volume of non-infected items of the same nature. The safe

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handling, and final disposal of this waste is therefore a vital element in an effective emergency response.

Garbage contaminated with bodily fluids or other infectious materials is becoming a bigger concern for hospitals as they brace for a surge in patients sick with COVID-19. Patients and health care workers are quickly going through medical supplies and disposable PPEs, like masks. Eventually all these gears pile up as medical waste that need to be safely discarded.

In Wuhan, officials didn't just need to build new hospitals for the influx of patients; they had to construct a new medical waste plant and deploy 46 mobile waste treatment facilities. Hospitals generated 6x as much medical waste at the peak of the outbreak as they did before the crisis began. The daily output of medical waste reached 240 metric tons, about the weight of an adult blue whale. With COVID-19, some items that were not previously considered medical waste, such as food, now need to be handled more carefully after coming in contact with a COVID-19 patient.

Furthermore, the safe management of household waste is also likely to be critical during the COVID-19 emergency. Medical waste such as contaminated masks, gloves, used or expired medicines, and other items can easily become mixed with domestic garbage, but should be treated as hazardous waste and disposed of separately. These should be separately stored from other household waste streams and collected by specialist municipality or WM operators.

COVID-19 is changing the landscape of the WM industry. Governments and international organizations such as the WHO are realizing the importance of upping hazardous management guidelines to protect the planet and fight against pandemics. Many WM companies are currently focusing their efforts on hazardous waste and increasing their facilities capacities. This trend will likely continue in the future as other high-margin niche services, such as the recycling and waste to energy (WtE) sector, would have to make room for hazardous and medical waste in terms of priority, especially at times of low commodity prices.

What of Recycling & WtE

Plastics are derived from byproducts of petroleum refining and natural gas processes. Oil prices are currently so low that it is cheaper for manufacturers to buy virgin plastic than it is for them to buy recycled by-products. When commodity prices hit rock bottom, it is not good news for the recycling industry, as recycling of waste is by itself a commodity trading business. The paper, metal, plastic and glass that recyclers collect, sort and sell, compete directly against so-called virgin materials.

As plentiful fossil fuels saturate global markets with cheaper oil, it has become cheaper for the makers of water bottles, yogurt containers and takeout boxes to simply buy new plastics. This, in turn, is dragging down the price of recycled materials, and straining every part of the recycling industry including WtE. As a result of the correlation with commodity prices, this segment of the WM industry is temporarily at risk.

For instance, Infinitus Energy opened a \$35 million recycling center in Alabama in 2014 bringing with it 110 jobs. By October 2016, it was hemorrhaging money and was forced to close down. Waste Management Inc., the largest operator in North America, has reduced the

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number of recycling facilities it operates from 130 to 100 in 2 years (or 23%), laying off over 900 people over the same period.

Recycling and WM companies as well as governments, experience losses during times of low commodity prices as the record shows. For instance, back in 2016, the city government in Washington paid Waste Management Inc. \$1.37m to accept the recyclables it collected from residents. That represented a stark reversal from 2011, when the district earned \$550,000 for sending the company roughly the same amount of material. At the facility operated by Waste Management Inc. in Newark, bales of plastic, paper and metal continued to pile up, each one representing accumulated losses for the company. Waste Management Inc. executives expected their recycling business to shrink further starting in 2017 and onwards.

An interview in the New York Times from Mr. Steiner of Waste Management Inc. during the Oil Slump in 2016, is a telling tale: “Our recycling business has dramatically changed, from a business we thought was going to grow very fast and very profitable, to one that is not growing at all and not profitable. It used to be that all players in the recycling ecosystem were able to make a profit. That’s not the case anymore. High commodity prices aren’t coming back anytime soon. This may be the new normal.”

Now with COVID-19 affecting a wide range of energy markets – including coal, gas and renewables – the impact on oil markets will be particularly severe because it is stopping people and goods from moving around, dealing a heavy blow to demand for transport fuels. China is being particularly hit as repercussions on their trade for being the epicenter of the disease are already showing significant impact. China is the largest energy consumer in the world and accounted for more than 80% of global oil demand growth in 2019. While the repercussions of the virus are spreading to other parts of the world, what happens in China will have major implications for global energy and oil markets.

To emphasize the importance of oil prices on the recycling industry at large, a study performed in 2015 by the economist Juan Reboredo investigates the dependence structure and conditional value-at-risk measure of systemic risk between oil prices and a set of global and sectoral renewable energy indices. His empirical data found that oil prices contribute around 30% to downsize and upside risk of renewable energy companies.

WM Companies Analysis During COVID-19

The below graph highlights the stock value performances of Veolia (VIE in pink), Suez (SEVI in blue), Biffa (Biff in orange) and Seche Environment (CCHE in green). As many companies did, these WM firms have all experienced a drastic drop in their share price starting in late February/early March 2020. However, they all have regained value in late March, as they are deemed part of the ‘essential’ industries in the post COVID-19 era. The steepest climb in terms of percentage change in the value of stock is seen in Biffa. Biffa has a large offering of hazardous and medical WM, offered, among others, to hospitals and surgeries, nursing homes, clinics and health centers, veterinary practices, schools, dental practices and medical facilities. Seche, the smaller French WM firm, is also highly geared towards hazardous and medical WM and was the best performing overall.

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Source: Reuters Eikon

The table below analyses the stock value percentage change as of March (the steepest drop day) and the following recovery as of 30th of April.

Company	March Value of Stock % Drop	30th April Value of Stock % Drop	Difference
Veolia	-25%	-13%	+12%
Suez	-35%	-21%	+14%
Seche	-14%	+3%	+17%
Biffa	-32%	-14%	+18%

The table below highlights the key performance ratio of each company as of the last 12 months (LTM).

Company	Revenue (\$)	Gross Margin	EBITDA Margin	P/E
Veolia	-	17.1%	14.0%	15.73
Suez	19,941,748,285	79.3%	15.2%	19.74
Biffa	1,451,479,220	9.0%	13.6%	26.40
Seche	-	64.6%	17.1%	13.99
Peer Mean	10,696,613,752	51.0%	15.3%	20.04
Peer Median	10,696,613,752	64.6%	15.2%	19.74

As a point of comparison, we have identified two highly specialized US-based hazardous waste management companies: Republic Services (RSG in purple) and Stericycle (SRCL in orange). The below graph shows their performance in terms of stock value percentage change.

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Source: Reuters Eikon

These companies followed the same steep drop at the beginning of March 2020, similar to their general WM counterparts, but they are recovering at the highest pace. As the table below highlights, although they experienced a drop in value of their stocks of 25% in March, Stericycle experienced the highest recovery of all companies presented with a gain back of 21% of its stock value and Republic Services witnessed a 16% recovery.

<i>Company</i>	<i>March Value of Stock % Drop</i>	<i>30th April Value of Stock % Drop</i>	<i>Difference</i>
<i>Stericycle</i>	-25%	-4%	+21%
<i>Republic Services</i>	-25%	-9%	+16%

The table below compares the key performance indicators for these companies LTM. It includes a similar company called Clean Harbors.

<i>Company</i>	<i>Revenue (\$)</i>	<i>Gross Margin</i>	<i>EBITDA Margin</i>	<i>P/E</i>
<i>Stericycle Inc</i>	3,308,900,000	36.0%	16.3%	
<i>Clean Harbors Inc</i>	3,412,190,000	30.0%	15.5%	30.76
<i>Republic Services</i>	10,299,500,000	39.8%	27.6%	24.08
Peer Mean	6,855,845,000	34.9%	21.6%	27.42
Peer Median	6,855,845,000	34.9%	21.6%	27.42

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Conclusion

COVID-19 has changed the world in an unprecedented manner. As economies reorganize against this sudden enemy, some sectors have emerged as critical. Protecting humans and the earth against pollution, toxicity and diseases have become services of prime importance to societies at large.

The WM industry, therefore, will be one of these sectors seen as essential and growth-oriented as a result of this pandemic. In this paper, we have looked at the WM industry forecasted growth globally before COVID-19. The industry was already solid, showing growth all over the spectrum from SWM to hazardous & medical waste. The impact of the COVID-19 virus is expected to take its toll on both the developed and developing nations, and WM will be at the forefront of industries dealing with the unprecedented transformations that will result therefrom.

Prior to the pandemic, emerging markets - due to population growth, and urbanization which lead to high volumes of SWM & hazardous waste - were at the forefront of the growth in WM services. For instance, India was and remains one of the fastest growing regions for WM in the world. SWM in India is projected to see capital requirements of close to \$65b by 2030. India has the potential to generate approximately 90 million tons/year of waste by 2030. The scale of growth in the Indian WM sector has attracted significant investments in recent years. The most notable was KKR's investment last year, acquiring a 60% stake in Ramky Enviro for about \$510m. The investment was part of the impact investing strategy, which refers to identifying businesses with positive social or environmental impact. Last week, news of KKR's wanting to sell its stake in Ramky emerged but the reasons regarding this swift exit remain confidential. The fastest growing sector within WM in India is recycling due to more stringent restrictions on pollution and treatment of waste. Within the recycling industry, the most promising sector is electronic waste (EW). India currently produces roughly 2.5 million tons or 5% of the global EW every year. With growth rates of almost 30%, Indian EW quantities double every 2.5-3 years.

Another anticipated high growth for WM is the Middle East, particularly MENA, which is expected to double its waste production by 2050. The gross urban waste generation quantity from Middle Eastern countries is estimated at more than 150 million tons annually. Bahrain, Saudi Arabia, UAE, Qatar and Kuwait rank in the top 10 worldwide in terms of per capita SW generation. Although we have investigated the high correlation between commodities prices and the recycling industry, MENA's recycling industry needs to develop in order to meet international standards and transform waste into a cleaner source of energy.

Looking deeper into the industry, we have seen that hazardous and medical waste were anticipating significant growth even before COVID-19. The pandemic has further emphasized the need to focus on these types of waste - which were increased 6x in Wuhan during the pandemic. This segment of the WM industry is anticipated to grow exponentially in the years to come. The greater focus on hazardous waste was apparent when looking at the performance of various WM companies during the pandemic. When analyzing business models of the general WM traded companies, Biffa seems to have recovered at a faster pace than its counterparts during the COVID-19 pandemic due to its heavy focus on recycling and hazardous waste. With over 100-year history and 95% UK postcode coverage, Biffa is engaged in

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collection, treatment, processing and disposal of waste and recyclable materials, as well as related work in the production and sale of energy derived from waste and the sale of recovered commodities, such as paper, glass, metals and plastic. The company has a special Resource Recovery & Treatment division that focuses on the treatment, recycling and disposal of hazardous and medical waste materials. When looking at specialized hazardous waste companies, their performances further support these findings, with swift recovery rates in the value of their stock during COVID-19.

We posit that emerging markets, particularly those of India and the Middle East, will remain some of the fastest growing WM regions. Although, WM as a whole will continue to grow significantly, and WtE will remain attractive in emerging markets that lack natural resources, COVID-19 and its impact will significantly boost the already growing hazardous and medical waste sectors.

The current pandemic of the novel coronavirus, COVID-19, raises questions and brings challenges regarding municipal and health related WM in terms of practices and procedures (safety and health measures for employees, waste treatment requirements, general procedures due to coronavirus for waste sector). The pandemic also brings new opportunities. Would offices, stadiums, barracks, schools, restaurants, airlines, airports, prisons, dormitories, retirement homes, among others, be content with a WM service that handles general waste, or would augmented health and safety measures be added? Pest control companies are unlikely to be able to handle such industrial level of fumigation and disinfection, as they will have to be integrated into the services of larger WM companies.

Those WM firms that can adapt and adjust their services to meet the challenges of the general WM sector as well as the more complex segments of the healthcare/hazardous/medical waste, will reap the benefits of the private as well as the public sectors' awareness to treat WM as an essential part of saving lives and livelihoods alike.

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