for each person each day producing 0.79 kg MSW [2]. Since the negative impact of MSW, appropriate and sustainable MSW management strategies are necessary for environmental governance and human health.

MSW management consists of several stages, namely waste generation, collection, transportation, sorting, recycling, treatment and disposal. The effectiveness of each stage plays a key role in the whole management system. Physical, chemical, and biological disposal methods play an important role in municipal solid waste management and are a major source of environmental impact. Physical methods such as landfills are widely used, but also pose considerable environmental challenges, including groundwater pollution, greenhouse gas emissions, habitat destruction and space occupation. Chemical methods such as incineration have the potential to generate energy in the process of disposing of waste. However, they also produce harmful emissions and byproducts, such as fly ash, that threatens the environment and human respiratory systems. Biological methods such as composting and anaerobic digestion are considered relatively environmentally friendly options, converting organic waste into valuable products such as compost and biogas. This paper aims at provide a comprehensive understanding of the challenges, opportunities, and environmental impacts of various disposal methods, offering valuable insights for future sustainable development within disposal of MSW.

wl2535@nyu.edu

MSW includes household waste, commercial wa
discarded building materials, hazardous waste, elec
waste, and waste from various institutions. It mainly co
from the solid waste produced in the daily life of ur
residents or in the activities providing services for u
daily life. Urban households, urban businesses, tou
services, transportation, and industrial enterprises accou
for the majority of urban solid waste production.
composition of municipal solid waste is heavily depende
on the source and location. The most common typ
municipal solid waste are household waste, commerc
waste, industrial waste, construction and demolition w
and biomedical wast

The world population will increase to over 8 billion by 20
and each person could produce about 4.9 pounds of
waste per day in 2018 [7]. As the developmen
urbanization, industrialization, economy, transporta
and general institutions, the use of municipal solid was
should be addressed and concerned to help catch up w
social developed pac

Household waste is generated by urban residents,
could be non-hazardous waste and hazardous waste
hazardous waste includes food waste, kitchen waste
paper or towels, and plastic material products like w
bottles, which could be recycled or composted by pr
disposal. Hazardous waste includes batteries, pesticid
solid products that might cause pollution or toxic elem
in the environment [3]. Groundwater can be affecte
household waste remains in the ground without any co
management. Also, household waste can have poten
cause human uncomfortable symptoms like head
issues of nervous system, etc. Commercial and indu
wastes are the byproducts of production or bus
operations which are not-for-profit solid wastes. Howe
commercial and industrial waste can hold the potentia
recycling, with recyclable materials such as pa
cardboard, and plastic often present in significant amo
According to the U.S. Environmental Protection Agenc
paper and paperboard products make up the largest p
of the municipal solid waste stream in the United St
accounting for approximately 25% of the total. Much of
paper waste comes from commercial and industrial so
such as offices, retail stores, and warehouses. Construct
and demolition waste (CDW) refers to the waste produc
from land excavation or formation, civil and build
construction, site preparation, deconstruction, mainten
of transportation infrastructure, and retrofitting of existin
structures [4]. CDW typically consists of a mix of hea
bulky materials which could be hazardous and
hazardous types. The hazardous materials contain as
lead, and mercury. According to the World Bank, CDW
accounted for about 30% of the total solid waste gene
in the world until 2018 [5]. Biomedical wastes are s
wastes generated during medical diagnosis, treatmen
immunization from human or animal sourc
Approximately 75% and 90% of BMW is non-hazardou
general medical waste. However, the rest of the 10% to
is considered as hazardous waste which causes s
environmental and public health impacts

operating conditions of the incinerator. In general, how fly ash usually contains a mixture of inorganic compou such as silicon dioxide, alumina, iron oxide, calcium o and magnesium oxide. It can also contain trace amou heavy metals and other contamina

One relevant experiment has dissolved 0.2 n hydrochloric acid and 0.06 mol/L sulfuric acid in wate mixtures to treat fly ash and analyze the leaching val the obtained heavy metals. It was found that under the liquid ratio of 20:1, the leaching value of lead and decreased by 99% and 96%, respectively

. Landfill has been the major appr to solve the large amount of MSW in China for years. Withi ten years from 2009 to 2018, the quantity of disposed M has increased from 112.32 million tons per year to 2 million tons per year [12]. Landfill has played an impor role in disposing of MSW and is responsible for over half the MSW per year, which is 117.06 million tons per y Most of the landfill sites in China are positioned in southeast area densely populated areas with adv industrialization, and they have the ability to gene electricity by using gas emitted from the landfill thro conversion equipment. Almost half of the gas produc the process of landfill is methane, after converting, eac of MSW can produce 65 Nm^3 of methane. There is resea recording that 3.3×10^{10} Nm^3 landfill gas can have potent to generate energy sources like electric power (7.39×10^{9} kWh) and fossil gas (1.7×10^{10} Nm^3) [12].

Dehydrated cement waste (DCW) was experimentally as an alternative adhesive to fix hazardous municipal waste incineration fly ash (IFA). DCW is produced dehydration of cement-based waste at different temper (200, 500, and 800 degrees Celsius). By mixing DCW IFA, more than 98% of the lead element was immobi and prevented from leaking out of the mixtur [7]

ts. composition of fly ash may vary, depending on composition of the waste being incinerated and

old Hazardous Waste (HHW) | US EPA
EPA, https://www.epa.gov/hw/household-hazard
waste-hhw, accessed on Apr. 18, 2

Experiments have shown that biogas and methane of
m^3/kg and 0.350 m^3/kg can be produced by anaero
digestion process at room temperature of 48 to 52 de
Celsius, organic load rate of 4.6 kg/m^3/day and MSW mas
of 148 tons per da 0