

# Overview of Construction & Demolition Waste (CDW) in Nigeria - Special focus on Lagos state

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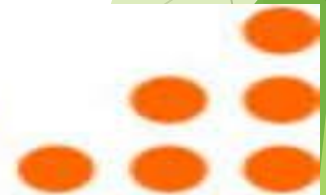
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# Paper Outline

- ▶ Introduction
- ▶ Waste Definitions and classifications
- ▶ Waste management
- ▶ Overview of C & D Waste in Nigeria
- ▶ Strategies for Effective CDW Management
- ▶ Source Segregation as a tool
- ▶ Waste Hierarchy as a tool
- ▶ Circular Economy as a tool
- ▶ Waste to Energy
- ▶ Material Recycling as tools
- ▶ Paradigm shift
- ▶ Benefits of Effective CD Waste Management
- ▶ Ponder on this!
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# Introduction:

## Lagos

- One of the 36 states of Nigeria with 57 LGA/LCDAs
- Size – About 3577 Sq. Km (0.39% of Nigeria's 923,773 Sq. Km)
- Population of about 22 million people
- 2.5 Million household with 6% annual Growth rates
- Commercial hub of Nigeria & the West African sub-region



Map of Nigeria

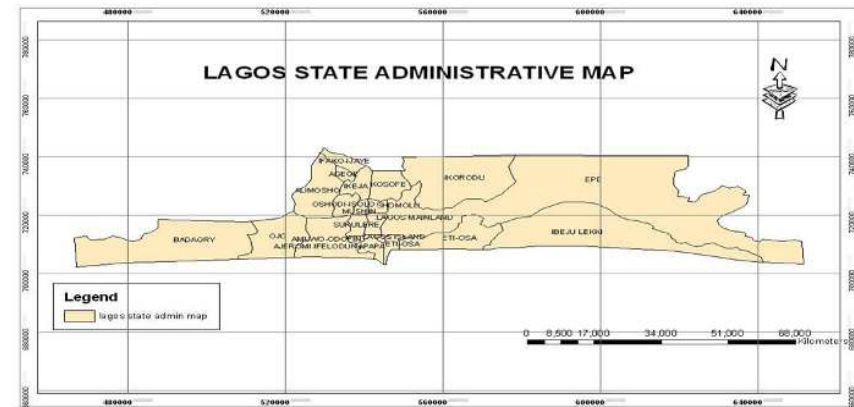
# Introduction 2:

## Lagos

- In 2015 Lagos became the 3<sup>rd</sup> largest megacity in the world. Currently working on transforming into Smart City.
- PSP in waste management commenced in Lagos in the 80s
- Over 70% of the total industries in Nigeria are cited in Lagos
- Generate between 17 & 20,000 MT of waste daily
- The generation per capital (GPC) is put at 1.2kg/person/day (WB)
- A typical waste composition shows that over 50% is organic organic fractions



Welcome to Lagos



Map of Lagos state

# Waste Definitions and classifications

## ► What is waste?

- Waste generation is as old as human existence, it occurs as a result human activities in consumption and production.
- There are so many definitions of waste depending on who is defining it.
- Generally, wastes can be defined as substances or materials that are of **no further value or use** to its generator.
- It can also be said to be substances or materials thrown away or about to be thrown away by the owner or generator. - Out of sight and throw away culture.

# Waste Definitions and classifications

## ► What is waste?

- The Basel Convention (Global convention on the transboundary movement of hazardous wastes - 1998) defined wastes as substances or objects that are disposed or are intended to be disposed or are required to be disposed of by the provisions of the National laws.
- To a recycler or an economist or an industrialist; Wastes is a raw material or resources in a wrong hand or wrong place.
- To a waste picker; waste is a hidden treasure yet to be discovered or waiting to be explored

# Waste Definitions and classifications

## ► What is C&D waste?

- Construction and demolition waste can be defined as all materials generated during or after construction or demolition activities, these activities could be new construction (of buildings, bridges, roads etc) or renovation / remodeling, total demolition or partial demolition. C & D Waste consists mostly of inert and non-biodegradable material such as Steel, Concrete, Blocks/Bricks, Planks/Woods, Cement, sand, granites, Ceramic blocks and tiles Asbestos products like roofing sheets, ceilings, aluminum, Glass, Plastics, Paints etc, a little percentage could be biodegradable in nature e.g woods/ planks.



# Waste classifications

## ► Waste Types

- Broadly speaking, there are 2 types of wastes namely; general wastes (Non-Hazardous waste and Hazardous wastes).
- **General wastes:** These are also known as non-hazardous wastes, they are usually harmless and do not pose an immediate threat to man and the environment. G.W includes household wastes, C&D wastes, commercial waste, garden waste etc. G.W may however become hazardous if not properly managed.
- This is because most wastes in developing countries, especially household wastes are disposed in a comingled manner (dry cell batteries, insecticide cans, asbestos etc)



# Waste classifications

- **Hazardous waste:** HzW can be defined as substances or materials that are injurious or harmful or dangerous (even in low concentrations) to human health, animals, plants and the environment.
- HzW can be in so many forms; it could be in solid, liquid, gaseous, effluent or powdery forms. Most time they are discharged by the industries as effluent, gaseous emission and solid waste. It could also be found in unsorted household waste, healthcare waste and from construction and demolition waste in form of asbestos.
- HzW could be explosive, flammable liquids, flammable solids, Poisonous-Acute, corrosive, toxic, & \_with Radioactive properties etc

# Waste classifications

- ▶ There are several classifications of wastes, however it is mostly classified by:
  - **Origin:** e.g Healthcare wastes, C&D wastes, MSW, Industrial wastes, agricultural wastes, nuclear waste, C&D Waste etc.
  - **Form:** e.g Solid, liquid gaseous and powdery wastes.
  - **Properties:** e.g Toxic, explosives or volatile, carcinogenic, reactive, acidic and alkaline
  - **Legal Definitions:** These includes special, controlled, household and industrial waste etc where specific definitions or criteria are used.
  - For the purpose of **Conversion**, waste can be broadly classified into 3; **The Recyclables, The Compostable and The Combustibles**

# Waste management

- **Waste management** can be defined as all efforts of humans including storage, collection, transportation, recovery, processing and disposal of all substances or materials that are no longer needed by the original generator.
- The Oxford Advanced Dictionary defines Management as the act or skill of dealing with people or situations in a successful way. Equally, Wikipedia defines Management as the act of getting people to accomplish desired goal and objectives using available resources efficiently and effectively, it includes *Planning, Organizing, Staffing, Leading or Directing and controlling* an organization or system for the purpose of accomplishing a goal.

# Waste management

- It went further to describe **management** as a human action including designs to facilitate the production of a useful outcome for a system
- Therefore waste management can also be described as human actions including *Designs, Planning, Organizing, Staffing, Leading or Directing and controlling* an organization or system for the purpose of accomplishing a goals.
- The goals to be accomplished with waste management are;
  - ✓ To reduce the effects of waste on human health. (Public Health reasons)
  - ✓ To reduce the effects of waste on the Environment. (Prevent air, water and soil pollution) - Our existence...
  - ✓ To maintain and improve the aesthetics
  - ✓ And lastly, for resource recovery (Material recovery for recycling and treatment purposes, also Energy Recovery etc)

# Overview of C & D Waste Mgt in Nigeria

- The management of CDW in Nigeria is still evolving. It is still at the elementary level, it is currently being undertaken at the informal level
- Except for some multi national construction companies that may be treating or recycling their CDW, all CDW generated in the area are used for land reclamation, sand filling and local roads upgrade.
- CDW is sorted, recycled and reused in an informal setting - When you visit a newly demolished building or bridge etc, you will see a lot of waste pickers - Resource Recovery Personnel (RRP) recovering valuables like steels, aluminum, wood etc from the rubbles. The rubbles from CDW is then sold to those who will use it to sand fill or reclaim land in swampy or water logged areas like Bariga, Iwaya, Makoko, Ijegan etc were reclaimed using a combination of CDW and domestic waste.
- No accurate data to quantify the volume of CDW generated or collected in Lagos state.

# Overview of C & D Waste Mgt Cont...1

- Globally, waste management has moved from the traditional / basic waste Collection and Disposal same for CDW
- Innovative Technologies plays crucial role in modern waste management practices, this has made effective and sustainable waste management more seamless.

## KEY STEPS TO SUSTAINABLE WASTE MANAGEMENT

- Set your vision: Ensure that the vision is SMART - Specific, Measurable, Attainable, Realistic & Timely.
- Set the goals you want to accomplished
- Policy Development - Including Legal/Regulatory framework, Institutional Development, Funding source/ Plan, Socio-Political issues (SWOT Analysis should also be deployed).
- Adoption of tools
- Policy Implementation & Monitoring
- Evaluation & Feedback
- Political WILL is key

# Overview of C & D Waste Mgt Cont...2

- **Current Legislation on CWD:** The Environmental Management and Protection Law 2019 gave some legal backing to effective collection and disposal of CDW in Lagos
- Section 79 of the law is titled: Domestic or Bulk waste
- Sub section 1 states that “ The occupier of premises on which domestic or bulk waste is generated **MUST** ensure that such waste is collected and disposed within a reasonable time”.
- Sub section 2 states that “A licensed Operator **MAY** collect domestic and or bulk waste, and deposit same at designated Recycling facility or any other facility authorized by the Authority.
- Sub section 3 states that “The owner or occupier of the premises on which **Construction Waste** is generated, **MUST** ensure that -
  - (a) Until disposal, all *construction waste* together with any container used for the storage, collection or disposal is kept on such premises private



# Overview of C & D Waste Mgt Cont...3

- (b) The premises on which the construction waste is generated does not become unsightly or cause a nuisance as a result of accumulated building construction waste.
- (c) Any construction waste which is blown off the premises is promptly retrieved; and
- (d) Pursuant to any directive from relevant government agency, any structure necessary to contain the construction waste is provided.
- Sub section 4 states that “Notwithstanding the provisions of subsection (3) of this section, the Authority may specify conditions for the storage and removal of building waste on a verge.
- Sub section 5 states that “Every receptacle used for storage and removal of construction waste may be placed on a verge.
- (a) Names, Address & Phone number of CoP clearly written on the bin
- (b) Bin is fitted with reflective materials
- (c) The bin is covered at all times except when receiving waste
- Section 6 & 7 - Ensure CDW is collected by a licensed Operator

## ■ Strategies for Effective CDW Mgt

The CDW is a comment of the general waste management, therefore the strategies for managing CDW is the same with general waste. The next slides will highlights various options that has been effective globally.

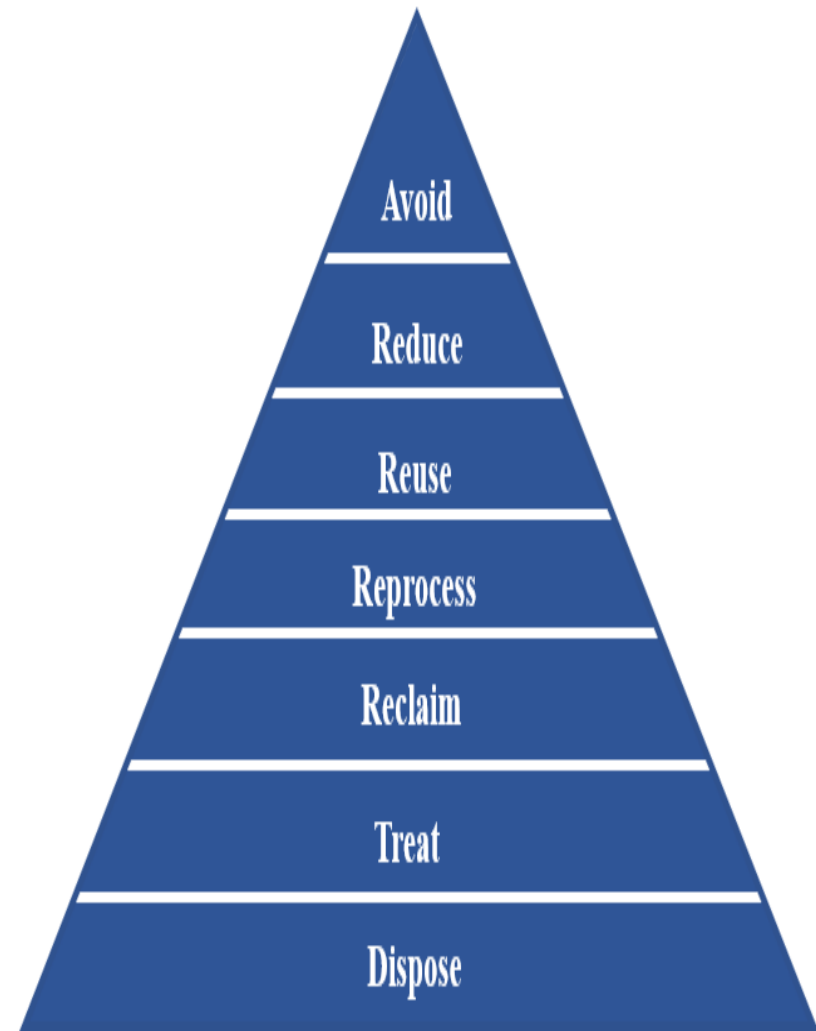
### ■ Source Segregation

- Waste segregation is one of the simplest strategies of implementing waste to wealth.
- Source segregation of waste is the process of separating the generated waste into different component at the point of generation.
- It encourages Recycling & Recovery
- It could be a source of income
- It provides clean & uncontaminated waste materials to the Recyclers
- It reduces the volume of waste disposed at the disposal sites



# Waste Hierarchy as a Tool

- Waste hierarchy is one of the widely adopted WM concept
- It is supported and promoted by the UN, through the popular 3Rs (Reduce, Reuse and Recycle).
- The concept classify WM strategies according its ability to promote or encourage Zero Waste.
- The concept is hinged on the extraction of maximum usage of a product and to generate minimum waste.
- There are some new arguments on the hierarchy.
- Another widely adopted WM concept is **Polluter Pays Principle**.
- It also encourage resource recovery



# Circular Economy as a Tool

- Circular Economy is another strategy of implementing total waste utilization.
- It is aimed at maximizing waste usage for a more competitive resource efficiency economy.
- C.E simply means reusing, repairing, refurbishing, recycling and energy recovery of existing materials & products, Usually called “Waste” (Not Take , Make & Dispose)
- It helps in the conservation of the natural resources.
- It encourages Recycling & Recovery
- It provides clean & uncontaminated waste materials to the Recyclers
- It reduces the volume of waste disposed at the disposal sites



# Waste to Energy as a Tool

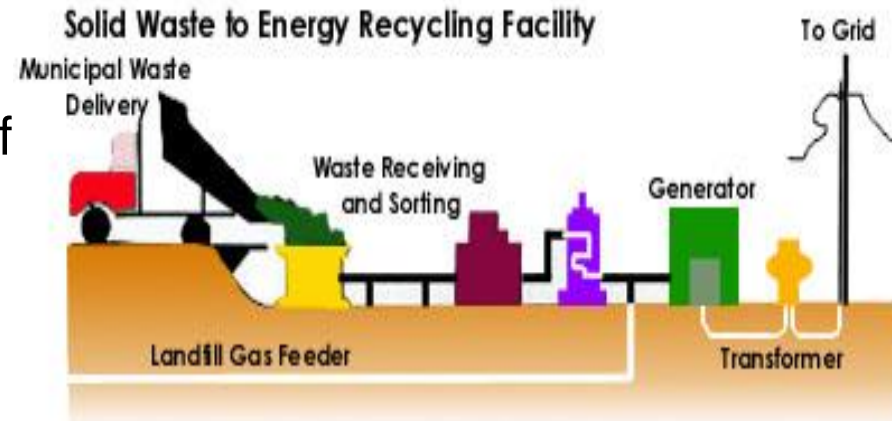
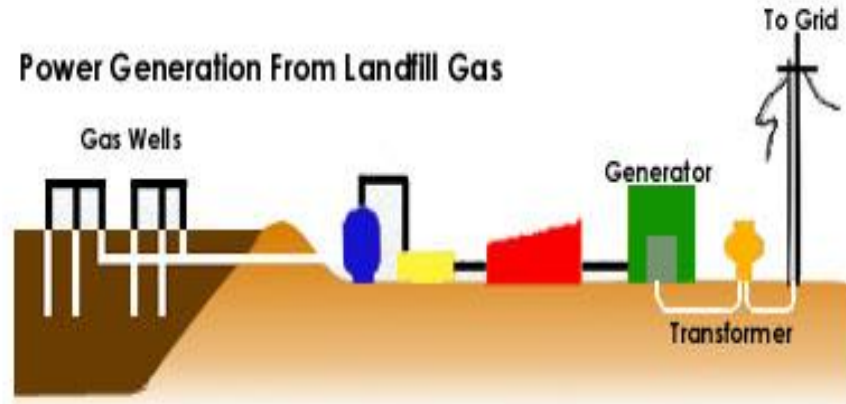
- Waste-to-energy or energy-from-waste is the process of generating energy in the form of electricity and/or heat from the primary treatment of waste, or the processing of waste into a fuel source. WtE is a form of energy recovery. (Wikipedia)
- It helps in reducing the emission of carbon Dioxide & Methane and replace fossil fuels usage.
- There are different technological processes of converting WtE, these include;
  - ✓ Gasification: It's a process of converting waste materials rich in carbon (High calorific value) through exposure to very high Temp ( $>700\text{ }^{\circ}\text{C}$ ), without combustion, with a controlled amount of oxygen and/or steam.





# WtE as a Tool...Cont.

- ✓ Pyrolysis: This is the process of thermal degradation of the waste in the total absence of air that produces other products like combustible gases, char/carbon, oil/wax
- ✓ Landfill Gas Recovery: Gas wells/Vents
- ✓ Anaerobic digestion - Breakdown of organic matters without Oxygen
- ✓ Incineration: It is a waste treatment process that involves the combustion of organic substances contained in waste materials. Incineration and other high-temperature waste treatment systems are described as "thermal treatment". **Incineration** of waste materials converts the waste into ash, flue gas and heat



NB: There is growing global concerns about the operations of Incinerators

# Material Recycling as a Tool

- Recycling is the conversion of waste materials into new raw materials or materials for both industrial and human consumption.
- Recycling technology could be simple or complex in nature;
- Several Recyclables C & D materials like Steel /Metals, Aluminum, Plastics, Paper, Glass, Concrete, Wood, etc can be converted into other useful products/materials





# Paradigm Shift

- ▶ The time for paradigm shift from the old way of seeing waste as a ‘throw away materials’ is NOW!
- ▶ The need for the regulation of the collection and management of CDW management in Lagos cannot be overemphasized .
- ▶ The government should begin to Think out of the box, in terms of products re-design, resource efficiency and the management of CDW in the most economically efficient and environmentally sound manner.
- ▶ It is time for the establishment of recycling and treatment facilities in Nigeria to utilize the waste from the industrial sector and residential homes.
- ▶ It is time to begin to see **cash** in our **trash**.
- ▶ Take note ‘waste is not waste unless you waste it’

# Benefits of Effective CDW Mgt.

- ▶ The benefits of effective and sustainable management of CD waste materials cannot be overemphasized. It encourages the adoption of both PPP and resource efficiency thereby ensuring fullest utilization of materials. The benefits includes, economic benefits, environmental benefits, social benefits and health benefits.

# Benefits...

## ► Economic benefits:

- Job creation, both direct and indirect jobs.
- It creates new line of Green businesses, such as transportation, resource recovery, processing and selling of recovered materials.
- Reduces the cost of production, through energy conservation, e.g aluminum production
- Reduces the cost of waste disposal
- Increased tax income for the government.
- Foreign exchange earnings

# Benefits...

## ► Environmental benefits:

- Reduced pollution of the air, water and land/soil.
- Saves or reduce the exploration of the natural resources.
- It helps to prolong the life span of disposal sites.
- Reduces deforestation.
- Reduces the generation of Green Houses Gasses which are released to the atmosphere when wastes are burnt, thereby causing climate change and global warming.
- Recycling brings about green economies

# Benefits...

## ► Health benefits:

- When plastics which is non-biodegradable in nature is burnt, it releases dangerous gasses like dioxins and furans that causes a lot of ill health like cancer, spontaneous abortion, lungs problems and several other diseases.
- Equally, when tyres are burnt, they also release several dangerous gasses too.
- Therefore when plastics are recycled, it saves us from some of these ill-health.
- Leachate from uncontrolled dumpsites are found to have polluted the underground water table thereby causing a lot of ill health.

# Conclusions 1...

- ▶ Using Lagos as a guide, it is pertinent to emphasise that **Political WILL** is key to a sustainable, effective & efficient integrated waste management system in developing a Smart City. In other to return Lagos state should take the lead in CDW Management. I will also like to recommend the following;
  - Set Vision that is SMART (Specific, Measurable, Attainable, Realistic & Timely)
  - Set Goals that are SMART too
  - In developing a WM model, every identified stakeholder must be carried along - Town hall meetings, Sustained Public Enlightenment & Education, NGOs
  - Creation of enabling environment through legislation & institutional frameworks. (Stick & Carrot Approach) - Regig the for comprehensive CDW management
  - Policy Implementation, Monitoring and Feedback must be taken serious
  - Increase budgetary allocation on WM
  - Develop local technology for WM (Think Globally - Act Locally) - My Cairo experience

# Conclusions 2...

- ▶ The government should ensure sustainable CDW management system, including Waste Avoidance, waste storage, Site to Site collection, transportation, recovery, recycling of CDW
- ▶ Both government and all identified stakeholders should prioritize capacity development, through training and re-training of staff, study tours and exposures etc.
- ▶ Bridge the GAP between the Town and the Gown
- ▶ The time for paradigm shift from the old way of seeing or handling waste as a 'throw away materials' is NOW!
- ▶ Nigerian construction companies should adopt total CDW Management through containerization, effective collection, recycling/treatment and safe disposal of all CDW.
- ▶ Advocacies aimed at institutionalizing sustainable Management of CDW should be embarked upon by Government and all other identified stakeholders.



# Ponder on this!!!

I will like to leave you with these parting words -  
Ponder on them!

“The Environment is our commonwealth and heritage, let us all preserve it by living right” - Adebola Olugbenga

“It is whatever you give to the Environment, that the Environment gives back to you” - Adebola O.

“Our lives begin to end the day we become silent about things that matters” - Dr. Martin Luther King Jr.

“The time is always ripe to do what is right” - Dr. Martin Luther King Jr.



**Thanks for your attention!**

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