

From Waste to Energy: A New Way to Use Non-Recyclable Waste

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Introduction



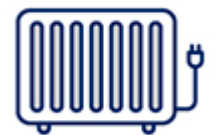
Demand for Energy Growth



Waste Landfills Growth



Electricity



Heat

Generation

Framework of Reference: UN's 2030 AGENDA and SDGs



SDG 7



- Use of solid waste to reduce the adverse per capita environmental impact of cities



SDG 11



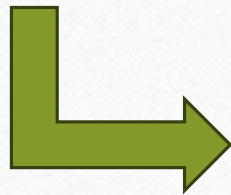
- Use waste solid as a source of energy
- Promote more efficient and sustainable waste management

Purpose of the Paper

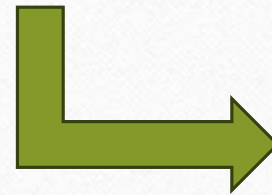
- Address the problem of energy shortage
- Find solutions to waste problems
- Solve both problems using the “Waste-to-Energy” method

Map of the Presentation

-
- I. The problem of energy scarcity



- II. Process of transformation of garbage into energy



- III. The advantages and disadvantages of the Waste-to-Energy Approach

- It is expected that this paper may inform the readers about the energy problem and show a new technique for obtaining energy.

Problem Statement: Solid Waste Impact

SOLID WASTE IMPACT

- With urbanization and improving living standards, the volume of MSW is increasing on a global scale.
- This waste can be of residential, urban, commercial, care, health, industrial or institutional origin and has long-term repercussions on human health and the environment.

Problem Statement: Solid Waste Impact



Open Dumpsites:

- Open dumpsites are locations where solid waste is indiscriminately deposited without operational control or environmental protection measures.

Problem Statement: Solid Waste Impact



Environmental issues dumpsites lead to:

- 1) Soil and water contamination
- 2) Greenhouse gas emissions
- 3) Impact on human health
- 4) Social issues
- 5) Impact on biodiversity

- **INADEQUATE WASTE DISPOSAL = SERIOUS ENVIRONMENTAL AND HEAT RISKS**



FROM WASTE TO ENERGY: THE TRANSFORMATION PROCESS

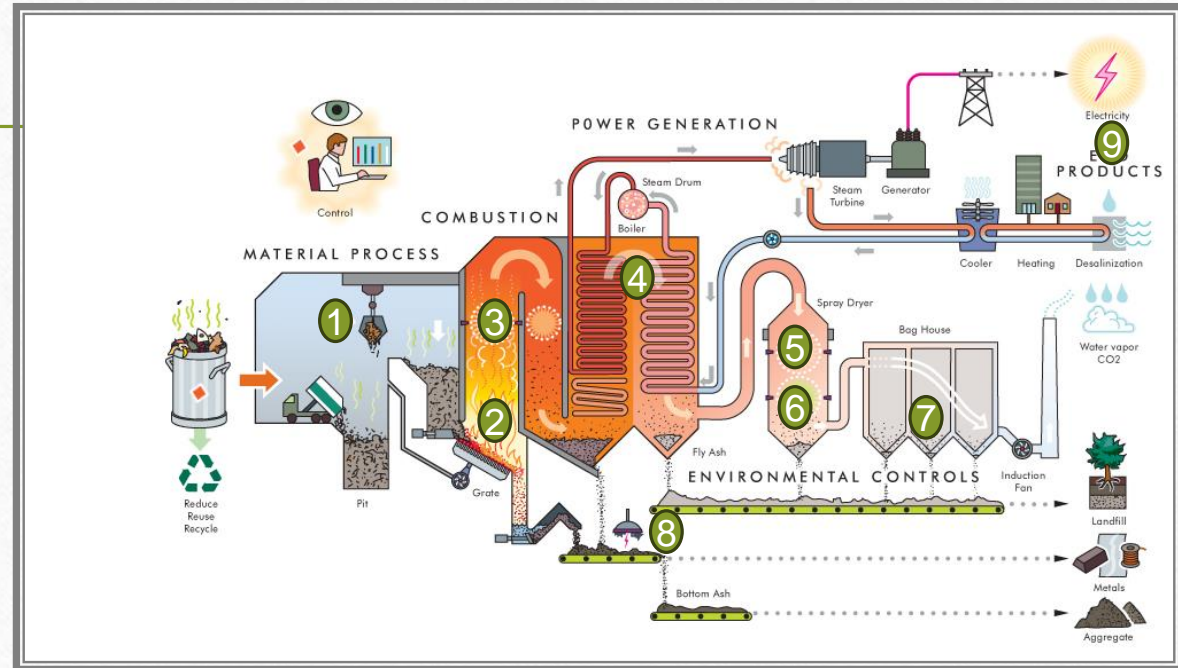
Municipal Solid Waste (MSW):

- MSW contains inorganic matter and mainly organic matter.
- The incineration is an alternative to recover the latent energy contained in organic matter.

Incineration Process

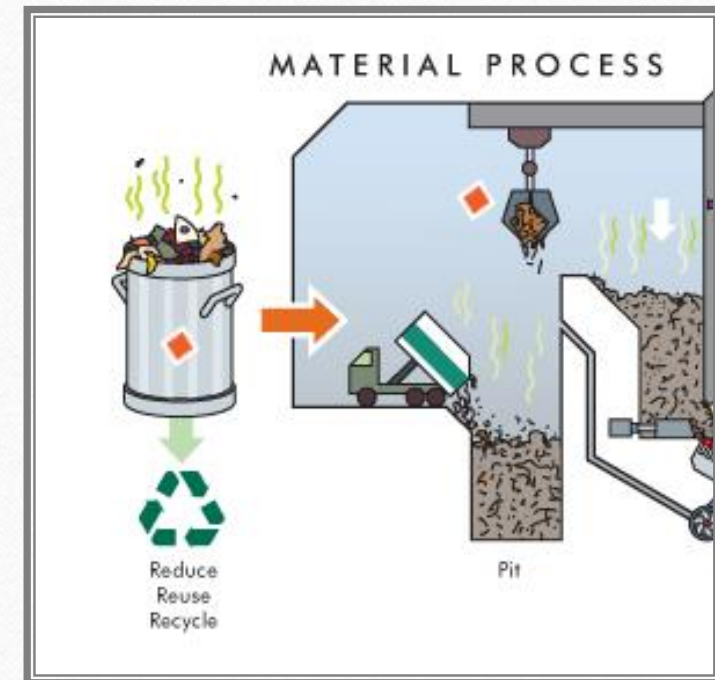
The waste transformation plants use household garbage as a fuel for generating power through incineration.

➔ To start the process:



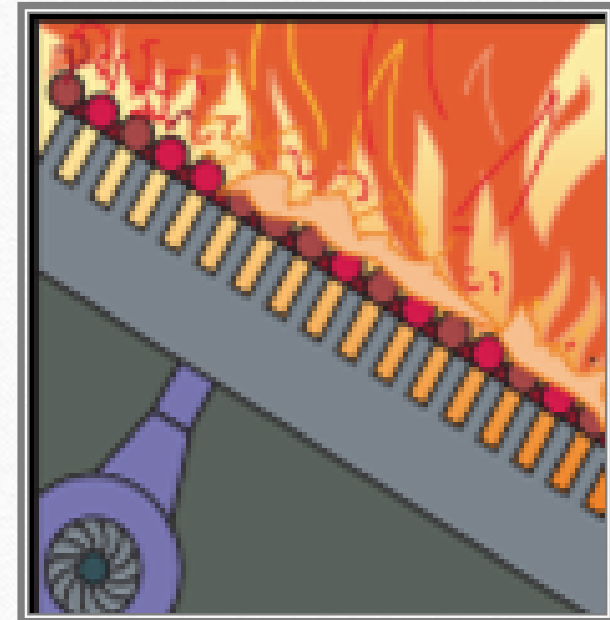
1) Material Process

- The trucks collect waste.
- The waste material is received in the plant.
- The waste is mixed and prepared for combustion.



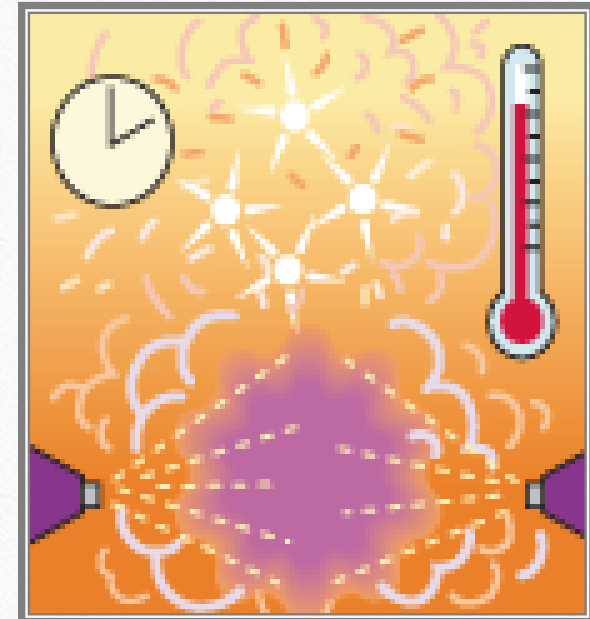
2) Efficient Combustion

- Mixed waste enters the combustion chamber.
- The injection of oxygen causes complete combustion.



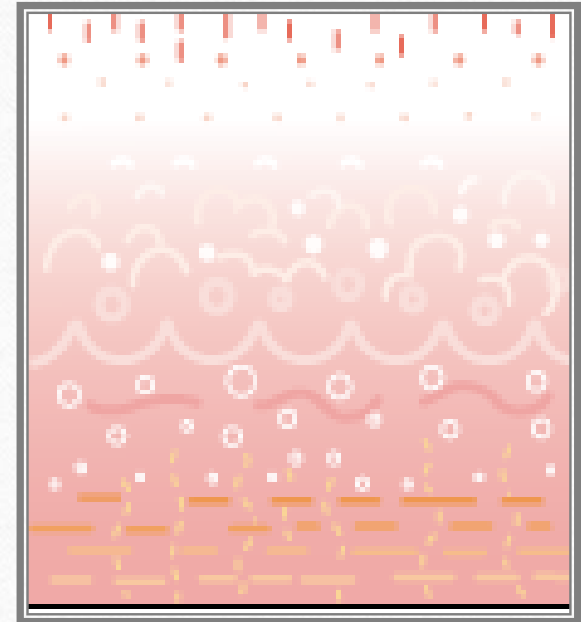
3) NOX Treatment Dioxins/Furans Treatment

- Nitrogen is neutralized by the injection of ammonia or urea.
- The effectiveness of this process is 99%.



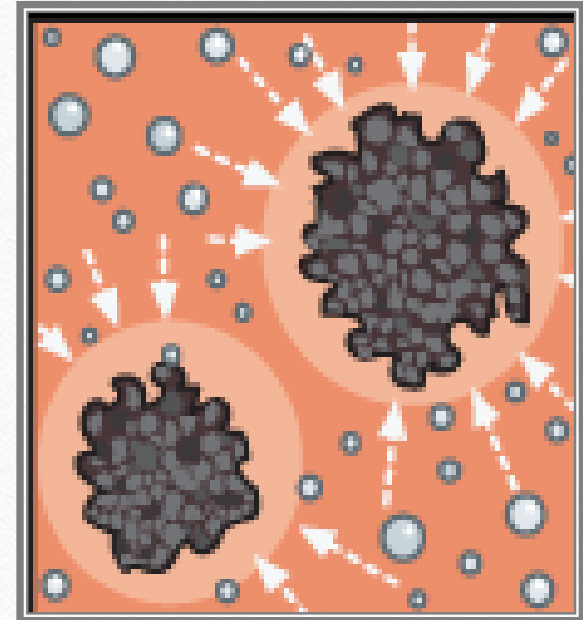
4) Steam Power Generation

- The steam is used to move the turbine
- The cooling steam is:
 - transformed into water.
 - diverted as a heat source.



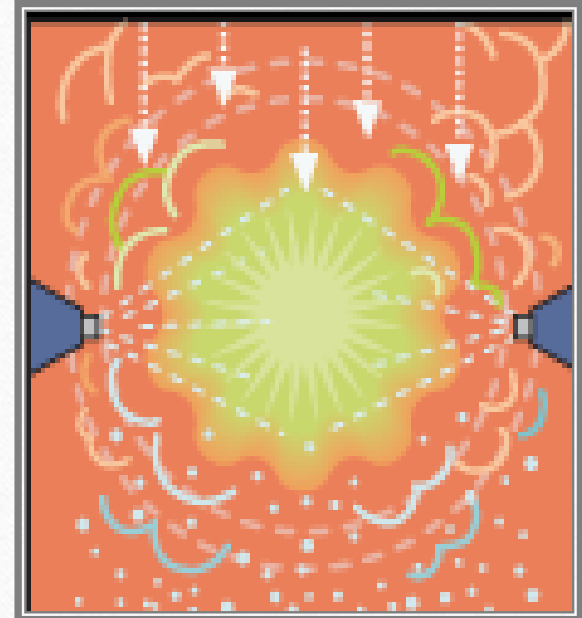
5) Mercury and Heavy Metal Capture

- Activated carbon is injected to remove heavy metals.
- Metals like:
 - Mercury.
 - Cadmium.



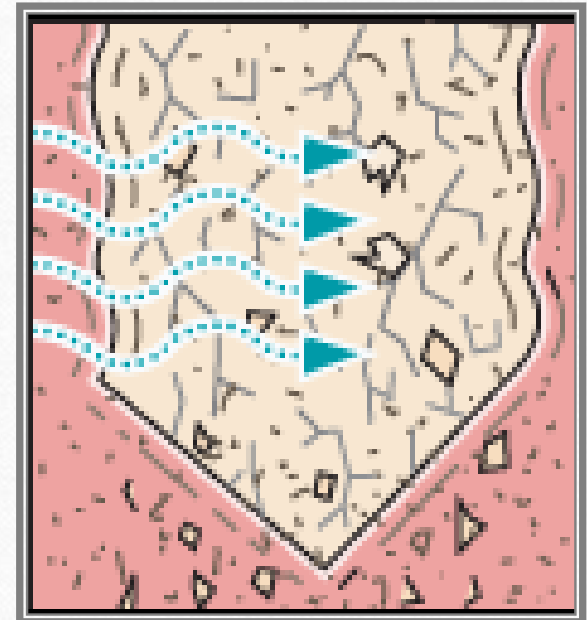
6) Acid Gas Treatment

- The acidic combustion gasses are neutralized with an injection of lime or sodium hydroxide.
- The chemical reaction produces gypsum.
- The process is 94% effective.



7) Fly Ash Capture

- The finest airborne particles are removed in the filter baghouse.
- Captured fly ash is often returned to landfills.



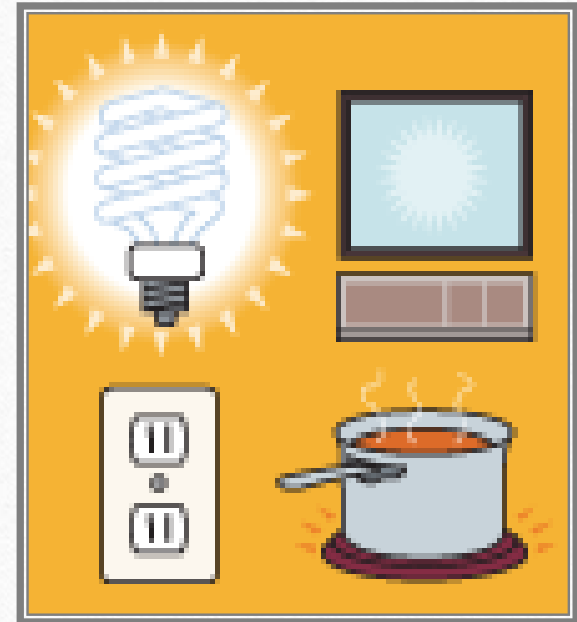
8) Bottom Ash Recycling

- The bottom ash remains of combustion are passed by magnets.
- The remaining ash can be used as aggregate.



9) Electric Power and Heat Generation

- A WTE plant produces enough electricity for 15,000 households.
- Each ton of waste can power a household for a month.



Advantages of the Proposed Method

- Reduction of up to 90% in the amount of solid waste
- Decrease in the demand for land for landfills
- Reduction in transportation costs to distant landfills
- Decrease in environmental pollution
- Electricity generation
- Heat generation

Disadvantages

- There is a requirement for qualified personnel in the plant.
- The residues can contaminate the environment if not handled appropriately.
- Incineration does not encourage recycling or waste reduction.

Conclusion

- Addressing the global energy problem while tackling solid waste issues is a multifaceted challenge.
- The Waste-to-Energy method holds promise for sustainable development.
- This process should stimulate the reduction of waste generation and promote recycling.

Thanks for your attention !!



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