

# THE STATE OF SOLID WASTE MANAGEMENT IN KENYA

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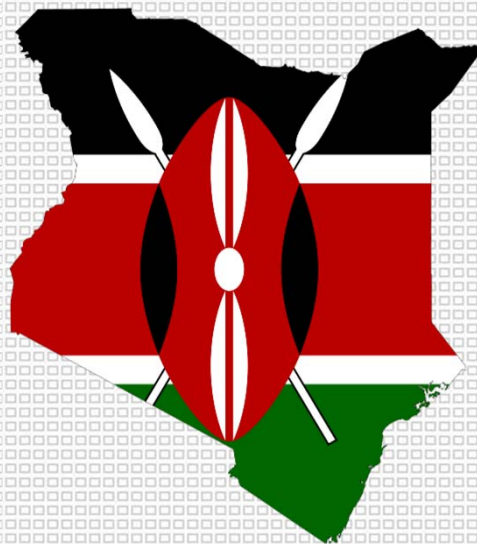
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# Introduction





# KENYA

**Population:** 44 million (2014)

**GDP:** \$79.9 billion (2013) Largest in East Africa

**Annual growth rate:** 5.1% (2014)

**Agricultural produce:** tea, coffee, corn, wheat, sugarcane, vegetables, Animal products.

**Industry:** small-scale consumer goods, agricultural products, oil refining; aluminium, steel, lead; cement, tourism

**Exports:** \$6.58 billion (2012)

tea, coffee, horticultural products, petroleum products, cement, fish

**Imports:** \$14.39 billion

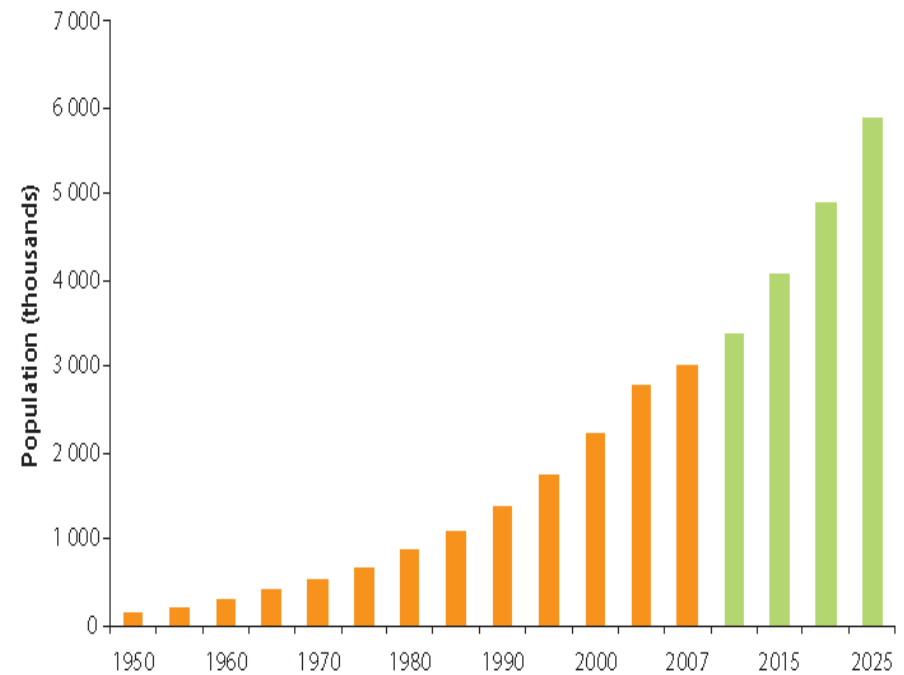
Machinery and transportation equipment, petroleum products, motor vehicles, iron and steel, resins and plastics



# CAPITAL CITY: NAIROBI

- Increasing urbanization, rural urban Migration and population growth have Resulted in increased solid waste Generation.

- This increase has not been accompanied With Equivalent capacity to handle the waste generated.



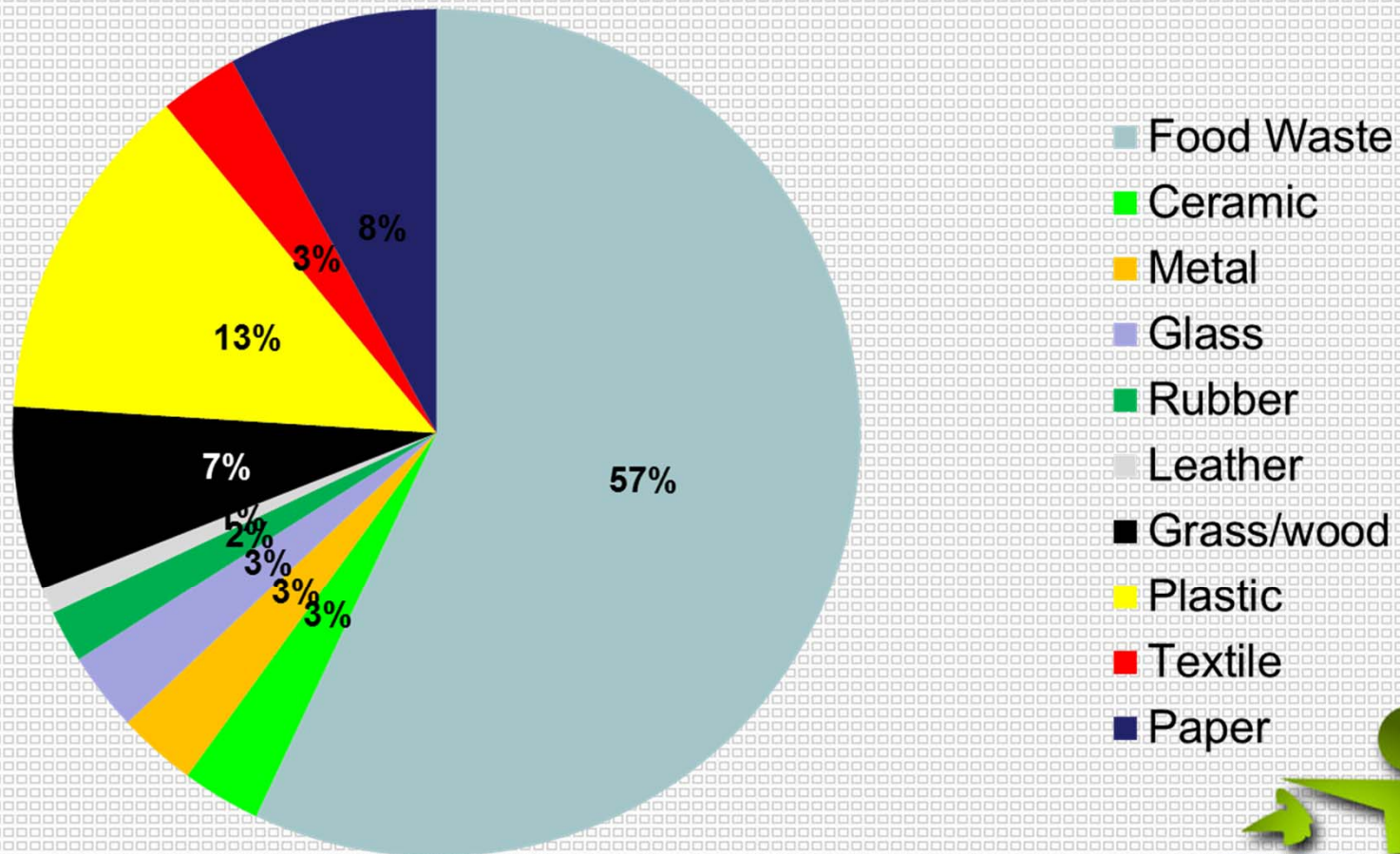
- By 2007, over 2 million plastic bags were Being handed out annually in Nairobi alone.

- 68% of waste generated in Nairobi comes from domestic, while 14% Industrial.





# Characteristics of Solid waste generated in Nairobi:2007



- Over 2000 tons/day (2008)



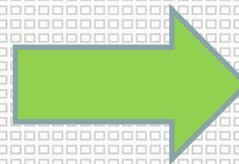
# Challenges





# Waste Sorting at the source

KENYA



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- Public awareness- Environmental, Economic potential
- Waste Separation facilities
- **Mixed waste = waste, Sorted waste = Resource**





# Inefficient waste collection and transportation

- only 25% of waste is collected in Nairobi.

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- Waste collecting points
- Inadequate waste transportation trucks.





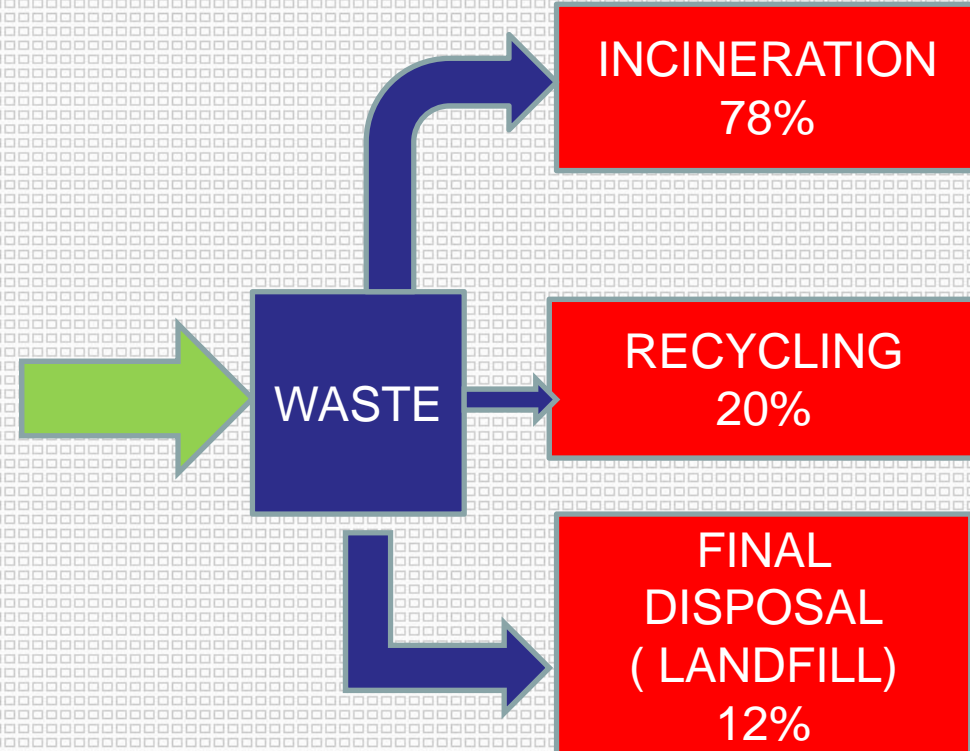
# Lack of disposal facilities

- All waste is taken to unprotected dumping sites

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- Individuals pick plastic for re use and metal for selling from the dump site





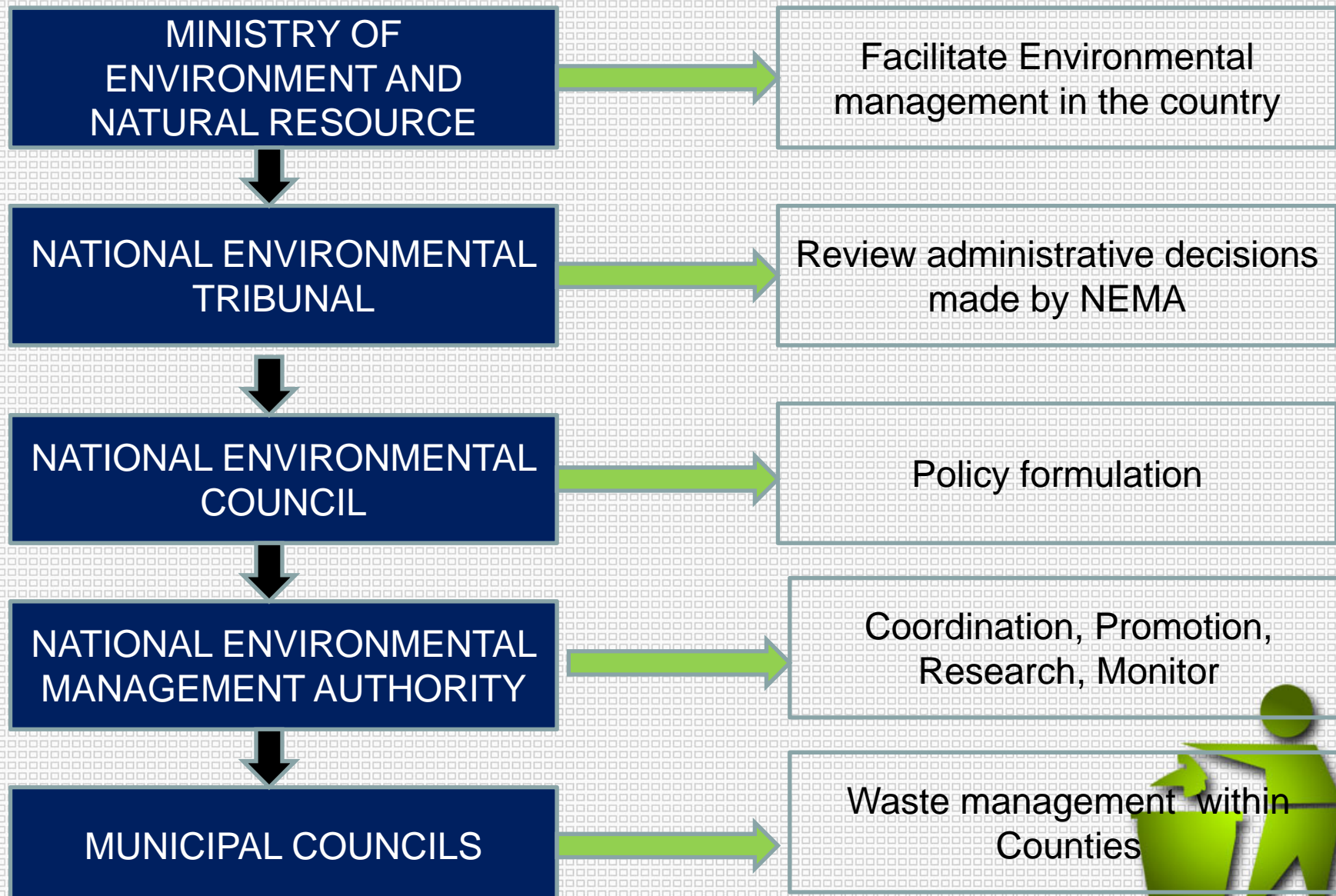
# Government's Effort



[dreamstime.com](http://dreamstime.com)



# STRUCTURE





# LEGISLATION

- The Environmental Management and Coordination Act (**EMCA**), 1999, is the framework law on environmental management and conservation.
- Section 87 of EMCA 1999 states that (2) No person shall transport any waste other than –
  - (a) in accordance with a valid license to transport wastes issued by the Authority; and
  - (b) to a wastes disposal site established in accordance with a license issue by the Authority.
- No person shall operate a wastes disposal site or plant without a license issued by the Authority.
- In Vision 2030, one of the flagship projects is the Solid waste management initiative which calls for relocation of the Dandora dumpsite and the development of solid waste management systems in five (5) leading municipalities.



# Way Forward





# AWARENESS



WASTE

NO SORTING,  
DUMPING

SORTING,  
EFFICIENT COLLECTION



UNHEALTHY



POLLUTION



POVERTY



HEALTHY



ELECTRICITY



WEALTH



# JAPAN



1. osouji



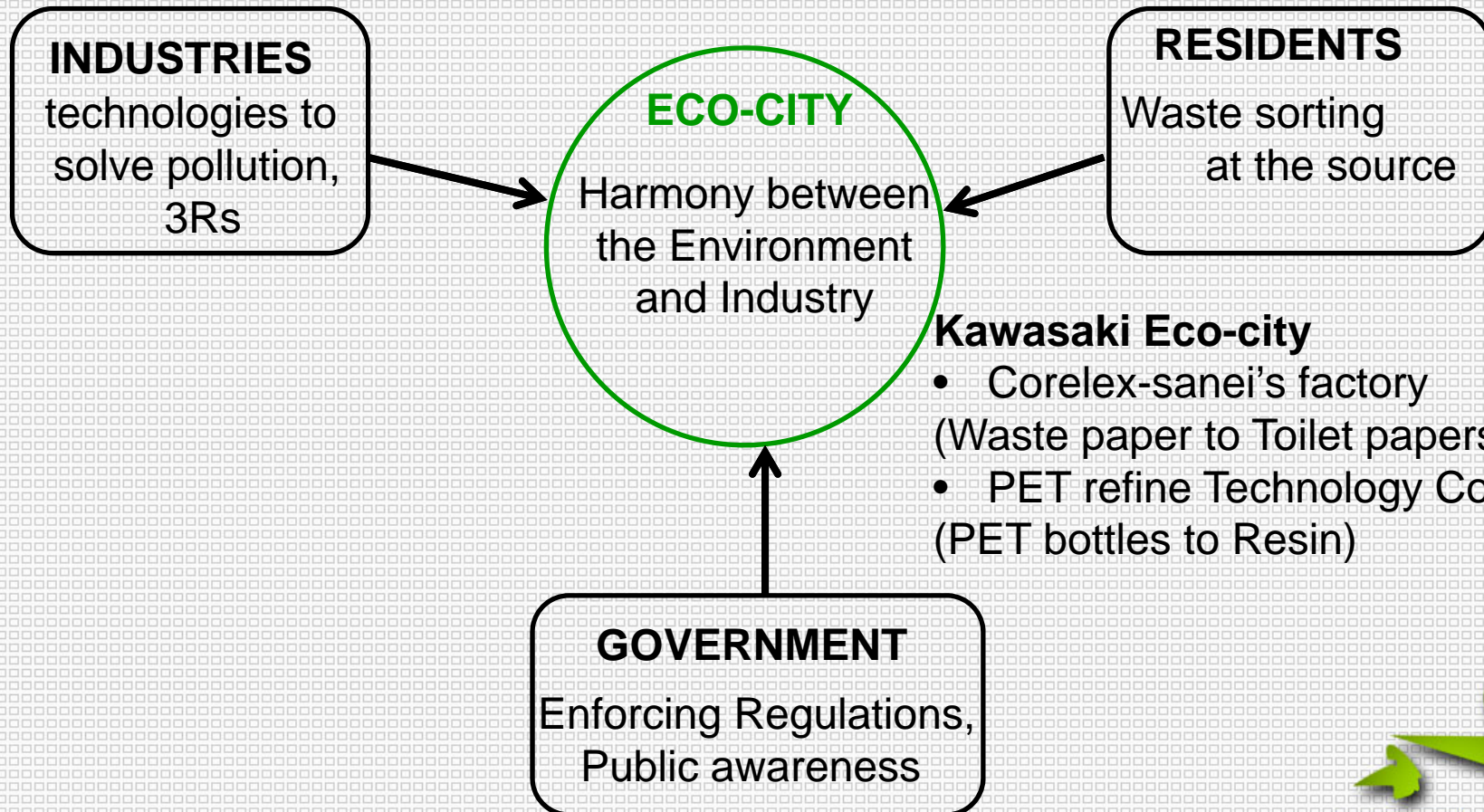
2. Environmental education

3. Apartment guides and training on garbage handling

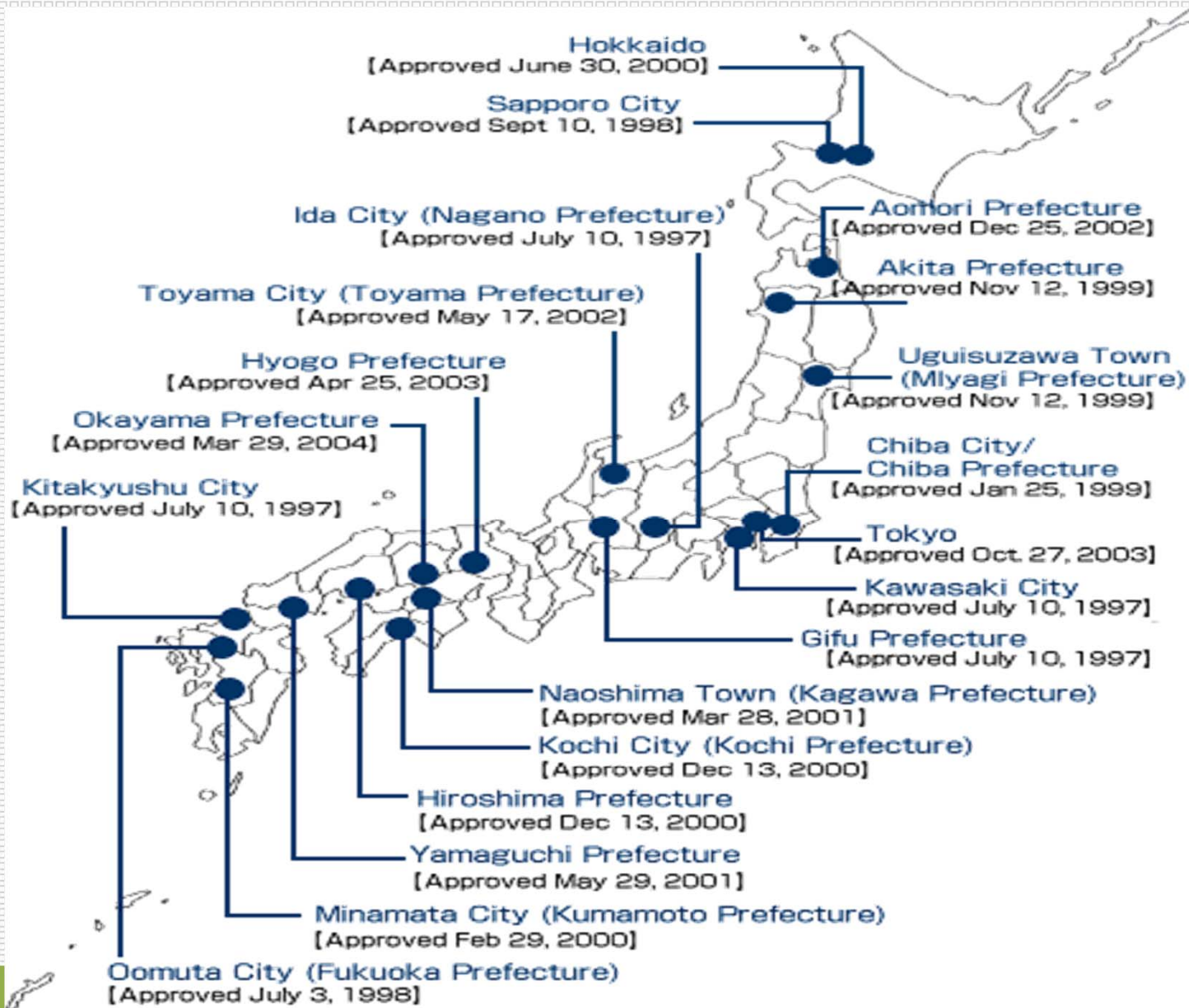




# ECO-CITY TECHNOLOGY



# ECO-CITIES IN JAPAN





# UPCYCLE TECHNOLOGY

- Creative reuse of waste



Sandals



Bench



Purses



Picture frame



# INCINERATION

- Shinagawa incineration plant has been redesigned and reconstructed to implement eco-friendly design, maintaining harmony with urban planning and promoting the national commitment to recycling.
- With input of 600 tons per day of waste only 180 tons of ash per day is produced hence the waste is reduced 3 times less hence extending the lifespan of landfill.
- Power generation of 15Mw





# SANITARY LANDFILLS

- Sandwich method- each day's residue is covered with soil before laying down additional waste.
- Compaction of waste
- Methane gas emitted from landfill is collected by pipes and burned in gas turbines to produce electric power.
- Leachate collection.
- landfilling is only when reduction and recycling are unfeasible, and is intended for the residue left after recycling





# DRY ANAEROBIC DIGESTION

## 1. Main Characteristics

- Low Moisture Content
- No need to deal with biomass slurry
- No secondary Pollution
- No cost on the biogas slurry

## 2. High Efficiency and low cost

- Facilities investment reduced 5 times
- Operation cost decreased
- Less energy consumption

## 3. Good Quality of Biogas



## QUOTE

**“Harmony with land is like  
harmony with a friend; you cannot  
cherish his right hand and chop  
off his left.”**

**ALDO LEOPOLD**

