



Solid Waste Management

from Waste to Resource

Presented by Mr. K. Baskaran - Chairman, IWMA



Introduction of IWMA

- ▶ IWMA was registered in 2002 and has facilitated the establishment and operation of a common hazardous waste treatment, storage and disposal facility through a service provider for industries in Tamil Nadu.
- ▶ Common hazardous waste treatment, storage and disposal facilities are in Gummidipoondi, Bargur and Virudhunagar.
- ▶ Besides periodic review of the landfill site operation, IWMA conducts seminars and offers consultancy services to industries/ industry clusters in partnership with institutions such as IIT-Madras on environmental issues related to air, water and waste management. Some of the services are,
 - ▶ Greenco certification
 - ▶ Energy assessment



Introduction of IWMA

- ▶ IWMA conducts “ENVIRO” program in collaboration with Science Olympiad Foundation for school children.
- ▶ IWMA annually conducts “Young Environmental Scientist” program under the guidance of IIT-Madras for promoting scientific research interest.
- ▶ Another initiative of IWMA is an “E-cap (e-waste collection and awareness program)” covering schools in the city has been taken up in partnership with CII-YI and TES-AMM recyclers.

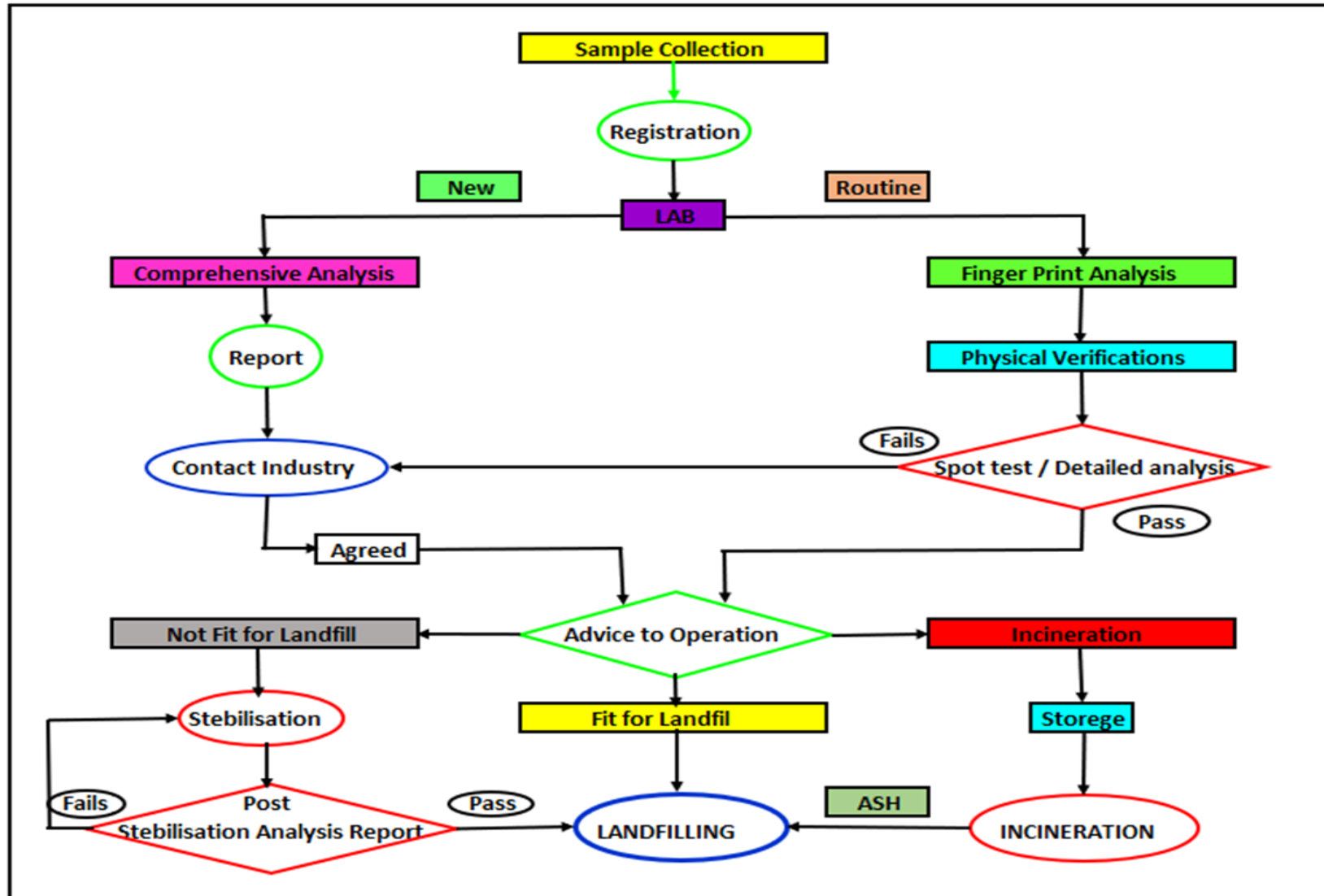
Hazardous Waste Management

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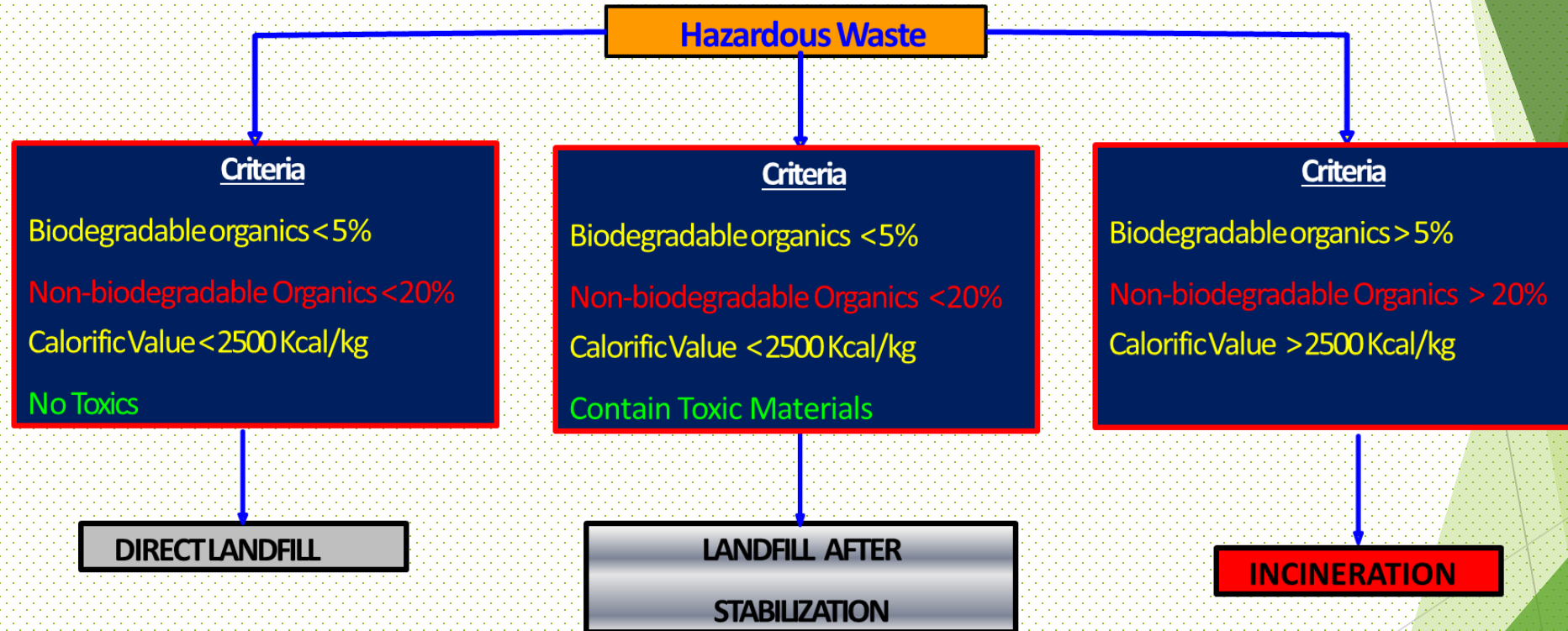
- ▶ The hazardous waste facilities consist of double composite liner landfills with a leachate collection system and a robust incinerator.

- ▶ Waste received from generators are being disposed off by four modes:
 - ▶ Direct land filling (DLF),
 - ▶ Land filling after treatment (LAT) and
 - ▶ Incineration (INC).
 - ▶ AFRF(Alternate Fuel and Raw material Facility)

Waste Handling Process



Hazardous Waste Disposal Path



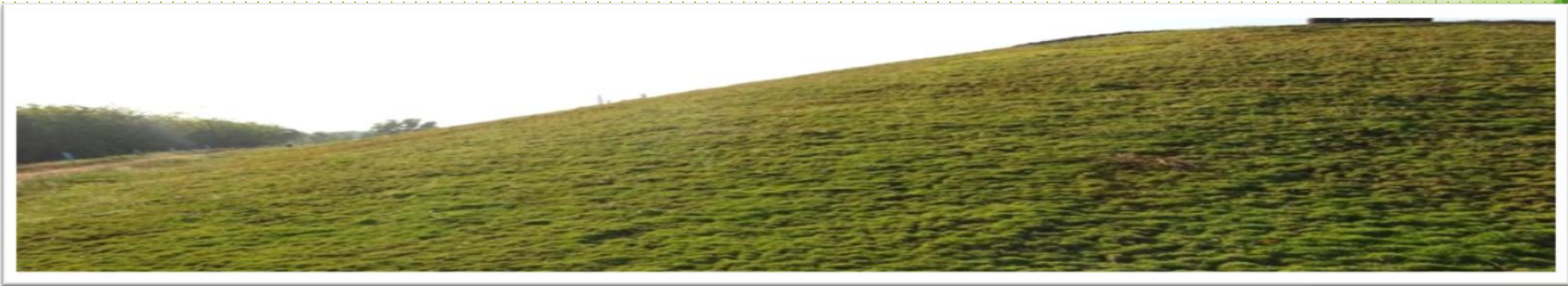
Landfill Operations



Before Capping



Capped Landfill



Incinerable Wastes

- Waste oil , oil emulsion
- Oil mixtures
- Hospital waste
- Solvent waste - spent solvents
- Pesticide waste
- Refinery waste
- Pharmaceutical waste
- Material contaminated with oil
- Grease and wax waste
- Organic waste containing sculpture, halogens,
- Others with calorific value > 2500 kcal / kg

Incinerator



AFRF

- ▶ AFRF means alternative fuel and raw material facility.
- ▶ Hazardous waste materials can be used as fuel and raw material in AFR facility barring certain exception stipulated in CPCB guidelines.
- ▶ Low calorific value, non-hazardous waste, inorganic materials can be used as a blender.
- ▶ Homogeneity of the mixers' parameter is vital for the end user.
- ▶ AFRF collects , transport waste from generators , process as alternate fuel and raw material and supplying to cement factory for co processing.
- ▶ Hazardous waste materials are processed using appropriate equipment for maintaining homogeneity of the product.
- ▶ Consistent quality and quantity is being maintained in the finished product.

Plastic Pyrolysis

- ▶ Plastic pyrolysis plant to convert multi layered plastic which is non-recyclable plastic into LDO oil (Light Distillate Oil)

LDO Oil

- ▶ Light Diesel Oil (LDO) is a non-automotive diesel fuel that is mainly used in low RPM engines and equipment. Light diesel oil is a type of diesel fuel that has flash point greater than 66°C and is widely used in certain types of boilers and furnaces as basic fuel.



lastic Pyrolysis

- ▶ LDO oil / Furnace oil Production & Carbon as output



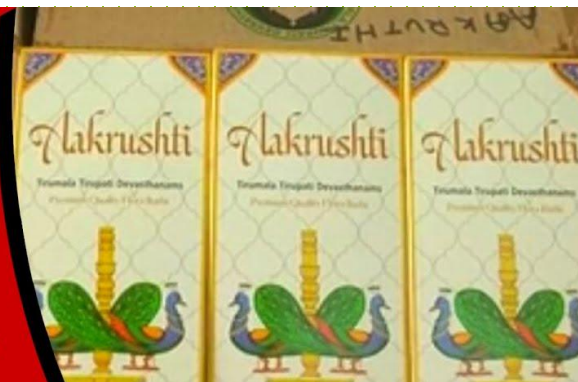
Importance of 3R's

- ▶ 3R's of environment i.e., Reduce, Reuse, and Recycle, are essential parts of waste hierarchy. 3R's works together to reduce the waste generated and for the improvement of the waste management process. It is also called as "The principle of the waste management process"

For example:

- ▶ TTD had come with an idea of making incense sticks from used flowers instead of dumping them as waste. Also planned to produce face pack, soaps, shampoo.

**Floral-based
incense sticks
by Tirumala
Tirupati
Devasthanams**



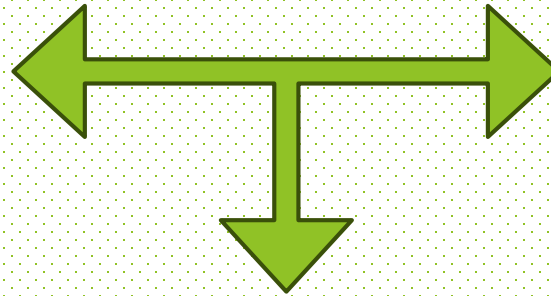
Recycling of Cotton waste

- ▶ Oil-soaked cotton waste is categorized under incinerable hazardous waste where the engineering industries generates huge amount of Oil-soaked cotton waste.
- ▶ This Oil-Soaked cotton waste is Non - Recyclable, only cotton rags and oil soaked in them is recovered for reuse. Hence cautious disposal of oil-soaked cotton waste is very important.
- ▶ Pelletization technology is one of the effective technology can be used for utilization and minimization of oil-soaked cotton waste by producing fuel pellets from them by using binder and additives.

Pelletization of Oil-soaked Cotton



Used cotton gloves



Pelletization



Oil-soaked cotton waste



Pellets used as Fuel Alternative

Recycling of Plastics

- ▶ Recyclable plastics like HDPE,LDPE,PP etc., can also be collected and processed in our facility as mixed feedstock and good quality plastic will be segregated and processed as pellets for recycling industry.



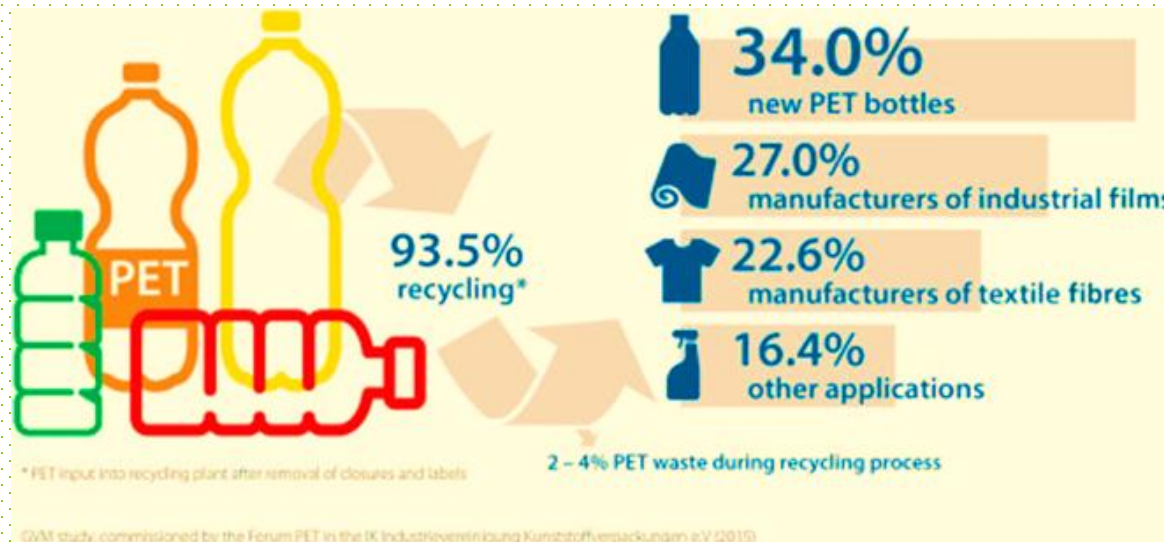
Recycling of Milk packets

- ▶ Milk plastics contain low density polythene (LDPE)
- ▶ Recycled plastics cannot be used as food grade.
- ▶ At the recycling units, the vendors wash and dry the packets, and then cut them up into small pieces. Through a machine, the pieces are then processed into plastic granules, and used to make products like garbage bags, pens, folders, reusing the plastic instead of sending it to landfills.

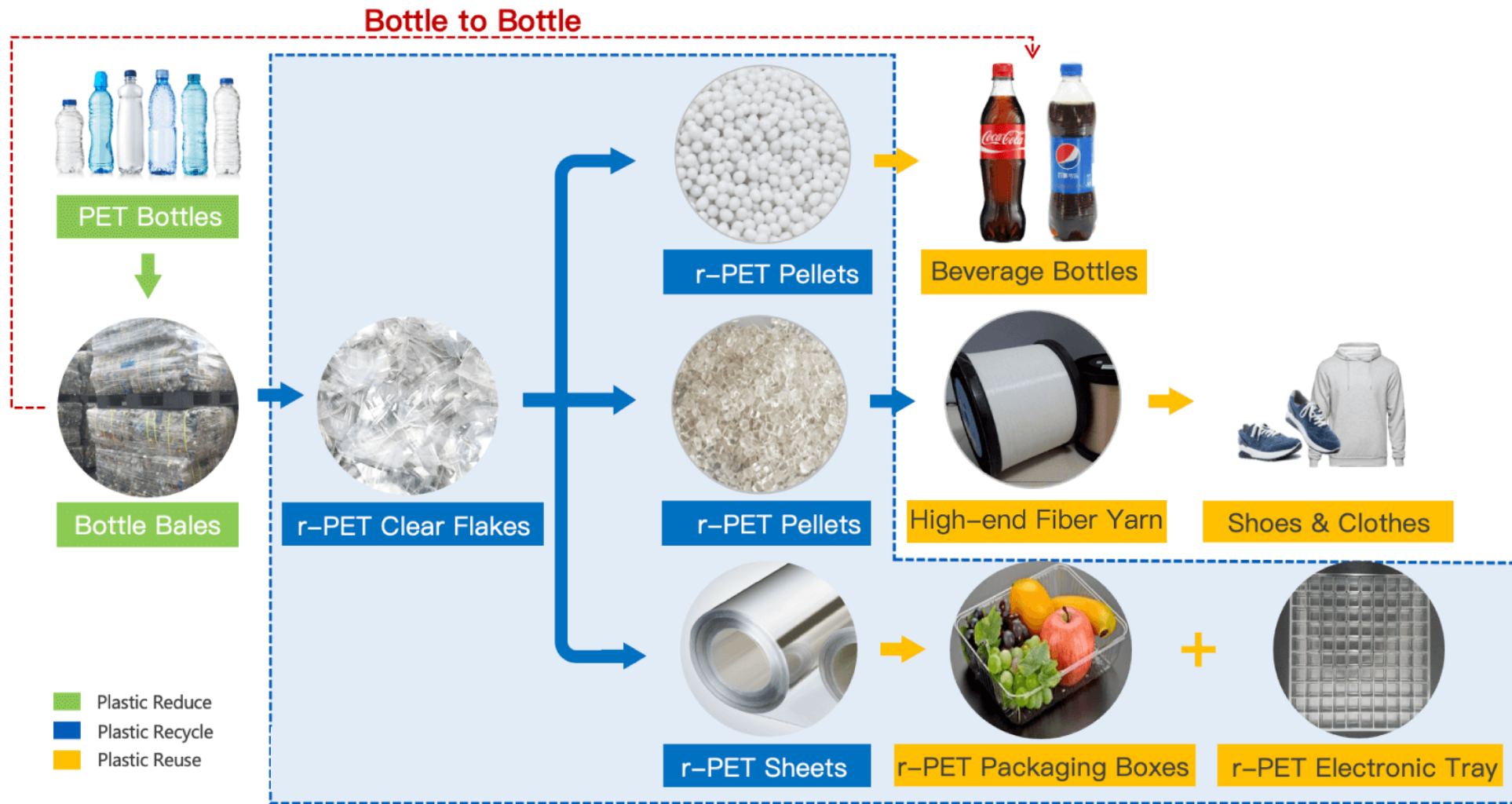


Recycling of Plastic PET bottles

- ▶ While bottle to bottle recycling is the ideal, as this process can be repeated, sometimes the plastic collected and sent for recycling is not of a high enough quality to be used in this way.
- ▶ In those cases, recycled PET is flaked and washed before being heated and stretched into fiber. This is then spun into recycled polyester yarn and used to make fabrics that can be used in seat belts, bags, carpets, roofing insulation and even clothing.



PET Bottle recycling



PET Bottle recycling

Which Plastics are Recyclable



Resin Identification Code

PET	HDPE	PVC	LDPE	PP	PS	OTHER
POLYETHYLENE TEREPHTHALATE	HIGH-DENSITY POLYETHYLENE	POLYVINYL CHLORIDE	LOW-DENSITY POLYETHYLENE	POLY-PROPYLENE	POLYSTYRENE (STYROFOAM)	MISCELLANEOUS PLASTICS

How to Recycle

Easy to recycle	Easy to recycle	Hard to recycle	Hard to recycle	Hard to recycle	Hard to recycle	Hard to recycle
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Used for

<ul style="list-style-type: none"> - Single-use water bottles - Cosmetic containers 	<ul style="list-style-type: none"> - Milk mugs - Shampoo bottles - Detergent bottles 	<ul style="list-style-type: none"> - Pipes - Toys - Air mattress - Window frames 	<ul style="list-style-type: none"> - Plastic wrap - Grocery bags - Squeeze tubes 	<ul style="list-style-type: none"> - Bottle caps - Food containers - Straws 	<ul style="list-style-type: none"> - CD cases - Foam peanuts - Disposables 	<ul style="list-style-type: none"> - Baby bottles - CDs - Sunglasses - Reuseable bottle
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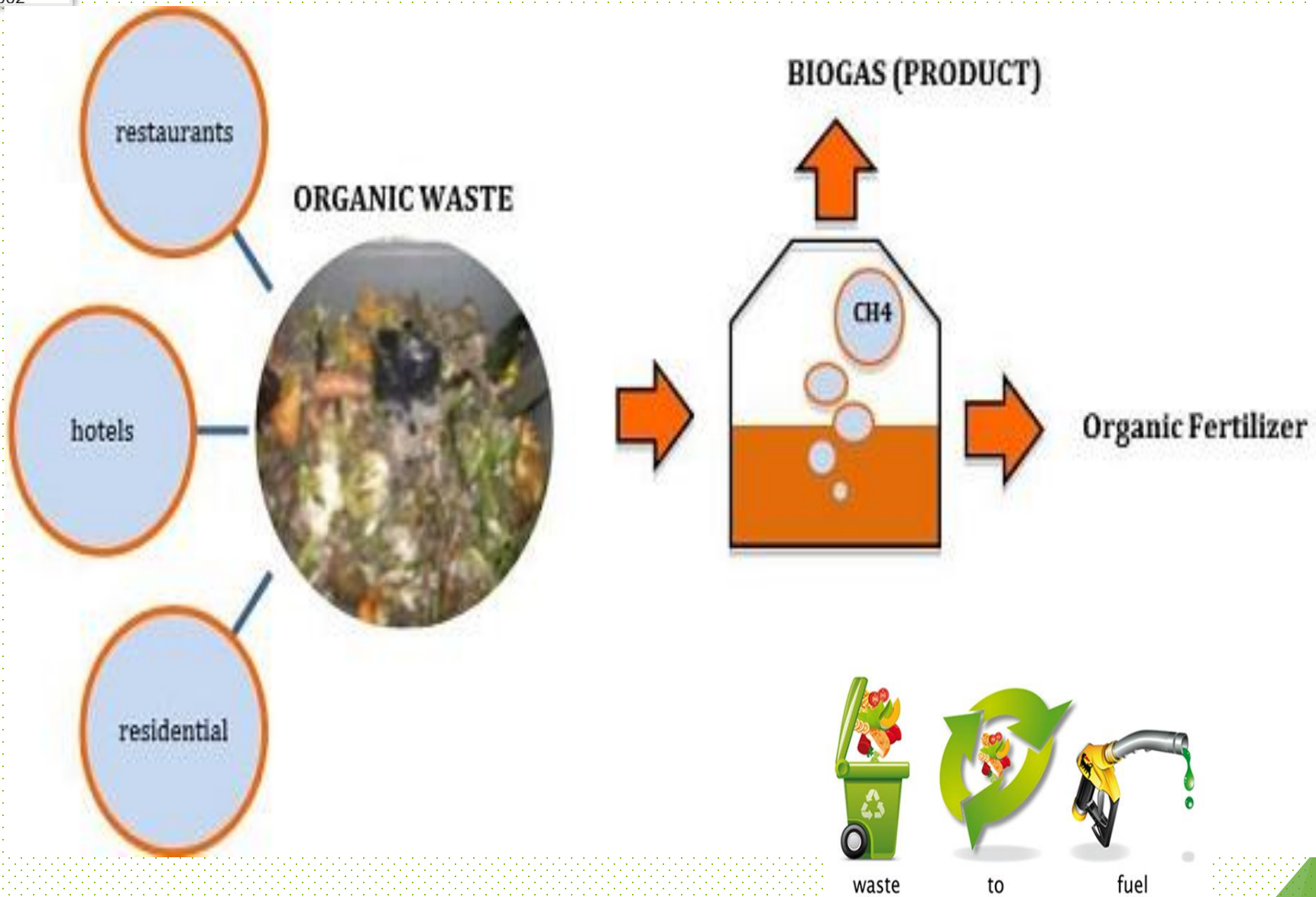
Recycled into

<ul style="list-style-type: none"> - New bottles - Fleece - Carpets 	<ul style="list-style-type: none"> - Bottles - Pens - Plastic lumber 	<ul style="list-style-type: none"> - Footwear - Mats - Hoses - Traffic cones 	<ul style="list-style-type: none"> - Plastic bags - Films - Trash bags 	<ul style="list-style-type: none"> - Industrial materials - Kitchenware - Clothing fibers 	<ul style="list-style-type: none"> - Packaging - Insulation - Toys 	<ul style="list-style-type: none"> - Outdoor signs - Plastic lumber - Automotive parts
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Recycling of Food Waste

- ▶ Food waste that is recycled also has many uses. It can be converted into fertilizers for agriculture or converted into natural forms of energy which are a good alternative to fossil fuels.
- ▶ This process uses microorganisms to break down food waste, animal manure, slurries and energy crops in the absence of oxygen, inside an enclosed system.
- ▶ As it breaks down it gives off methane, which is collected and converted into biogas and used to generate electricity, heat or transport fuels.
- ▶ It also creates a nutrient-rich digestate that can be used as a fertilizer for agriculture and in land regeneration.

Food Waste to Fuel





THANK YOU