

Waste management





Waste?

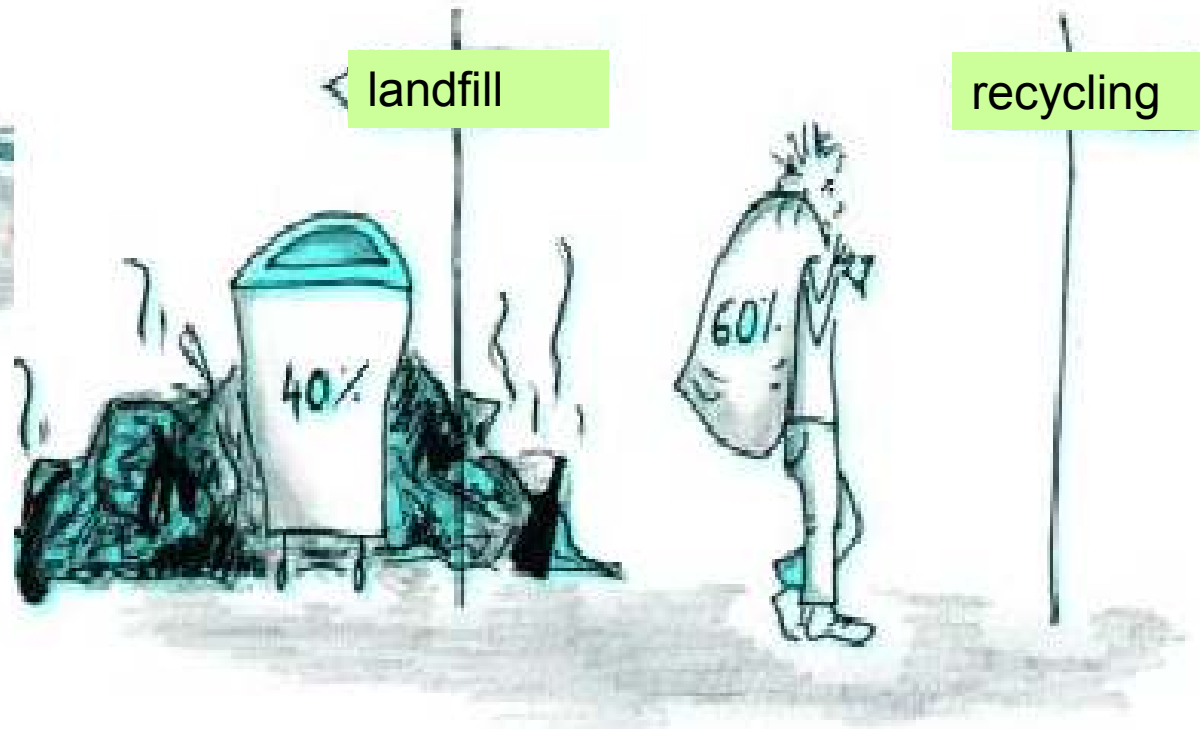
Trash?





Tresh is everything thrown in the bin and next. One should pay for its manufacture, transport, storage, for its removal, management (burning or taking into landfill). Garbage can contaminate the soil, ground water, air and can destroy the habitat.

Tresh is called waste if the garbage is made useful, i.e. it is separated on material types (e.g. paper, plastic, glass) and collected for recycling it later.



Waste of garbage?

- Waste: produced by **human activities** (production, consumption), a material that is **neither transferable nor tradable material at its place of origin.**
- Approach to the natural cycles!
- Secondary raw material;



„Waste – resource in a wrong place.“
Chinese proverb

Waste

- useless material arising from the activities of the society (or creatures, or living community), existing at specific location and any given time;

Its classification:

- ✓ production;
- ✓ settlement (=household, communal);

USA (2004):

- ✓ production : approx. 4.9 billion tons (formerly even 6 billion tons);
- ✓ settlement : 230 milli6 t (formely even exceeded 300 million tons);

Hungary (2004):

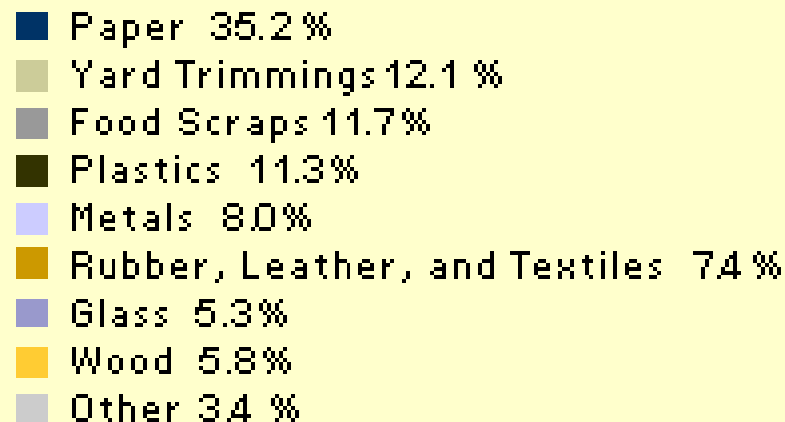
- ✓ 60-80 million tons (formerly even 100 million tons);
- ✓ 10-11 million tons (its volume has been multiplied since 1990!!!!);

Settlement waste

- **In Hungary** its amount has increased by 2-3% per year;
 - liquid waste: \approx 5 million tons/year;
 - sewage sludge : \approx 1 million tons/year;
 - solid waste : 4 million tons/year,
 - ✓ 2/3: from household;
 - ✓ 1/3: from institutions;
 - ✓ \approx 0,6 million tons/year is of unknown origin;
 - The majority are still not recycled;

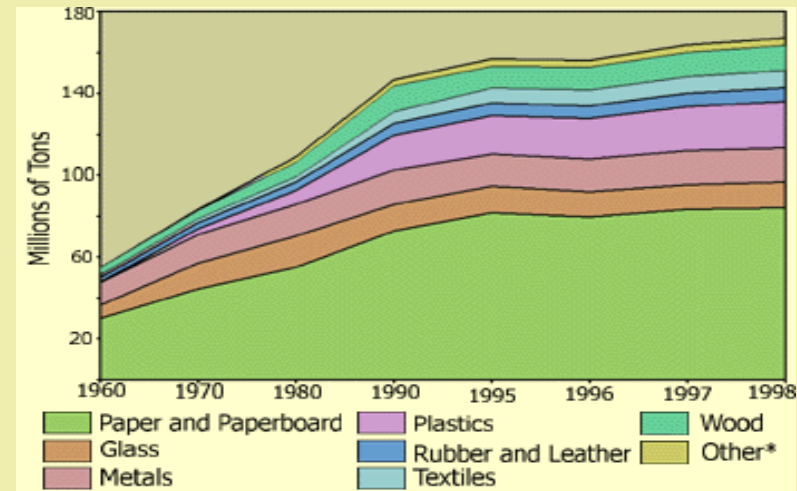
- **USA:**

**2003 Total Waste Generation–
236 Million Tons
(before recycling)**



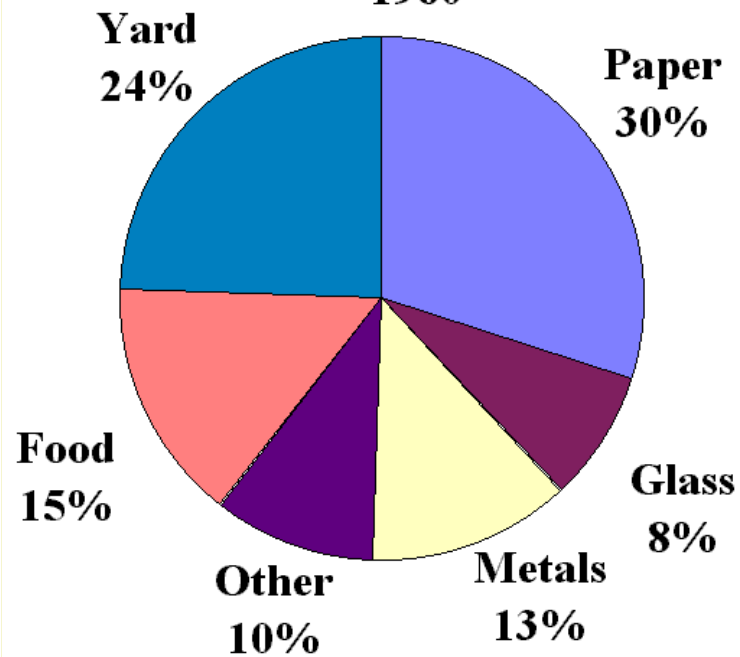
Distributon of household waste

USA



Solid Waste Composition

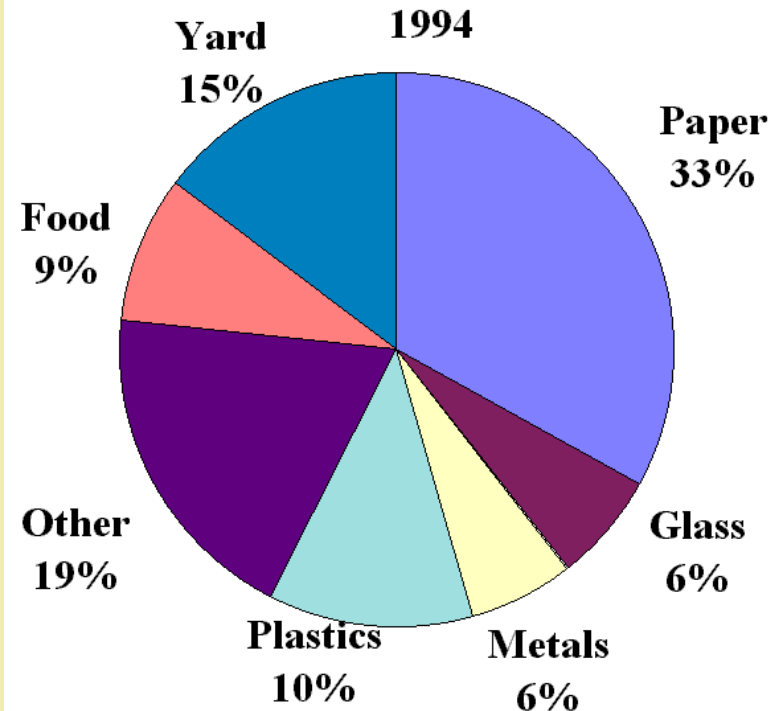
1960



What is missing?

Solid Waste Composition

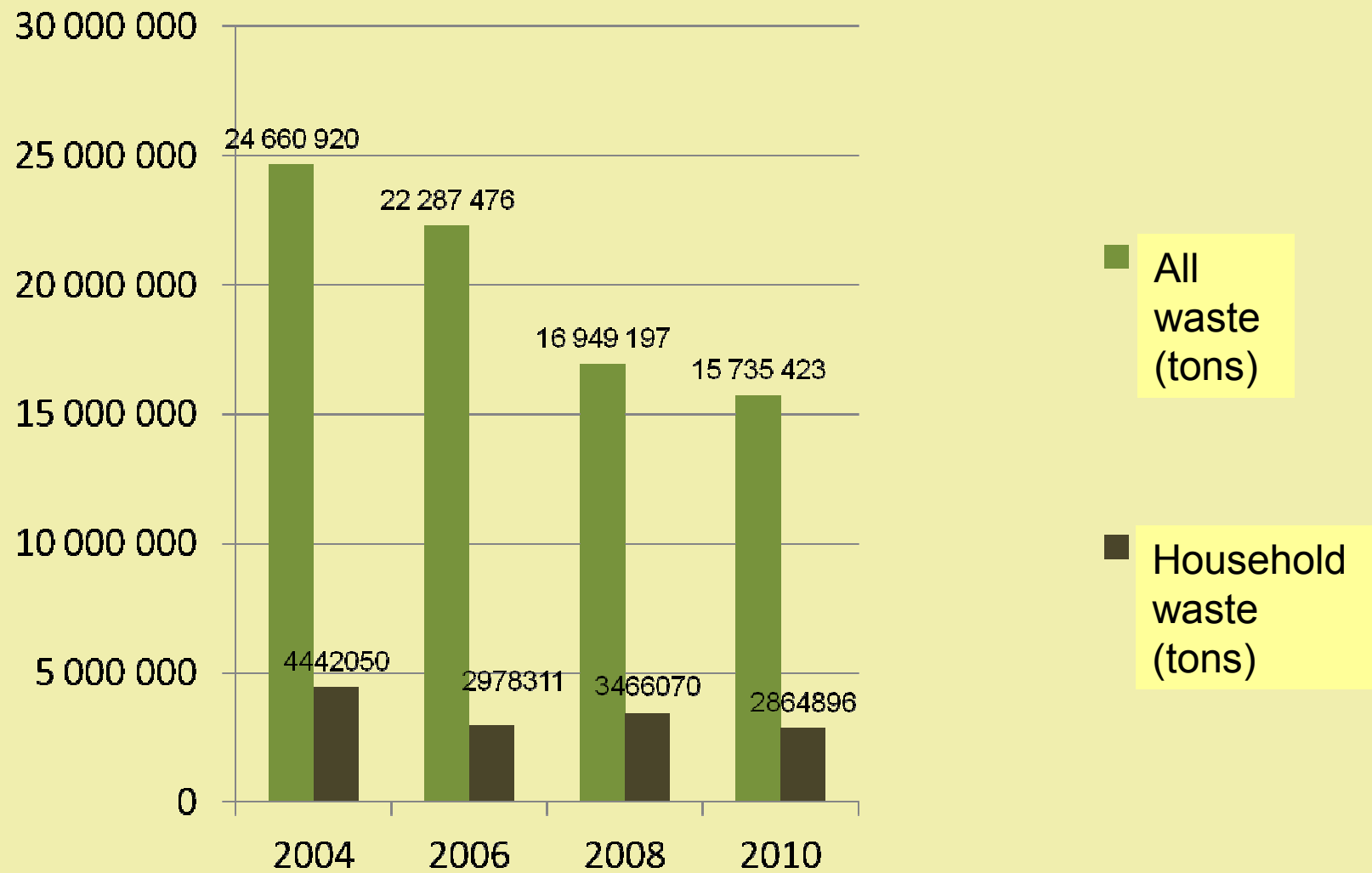
1994



Hungary

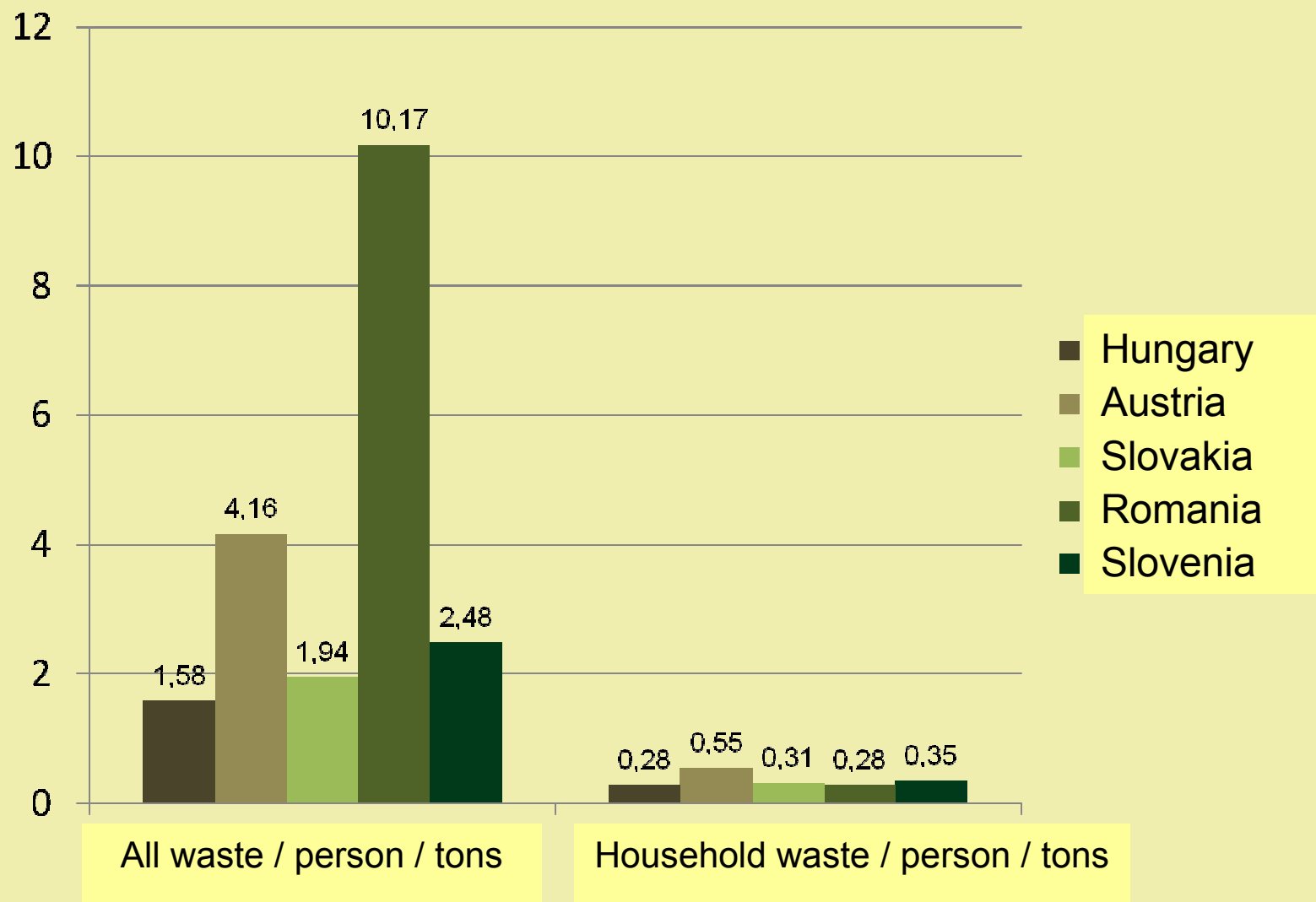
- **Paper:** 25% —→ increases;
- **Compost:** winter 10-20%, in other seasons 40-50% —→ decreases;
- **Metal:** 3-5%, sometimes 10% (cans) —→ increases;
- **Glass:** 3-4% —→ increases (by this time there are hardly returnable);
- **Plastic:** 5-10% —→ increases;
- Its small portion is **hazardous waste** (see later);

Waste in Hungary



Source: Eurostat

A keletkezett hazai hulladékok összehasonlítása a szomszédos országokéival

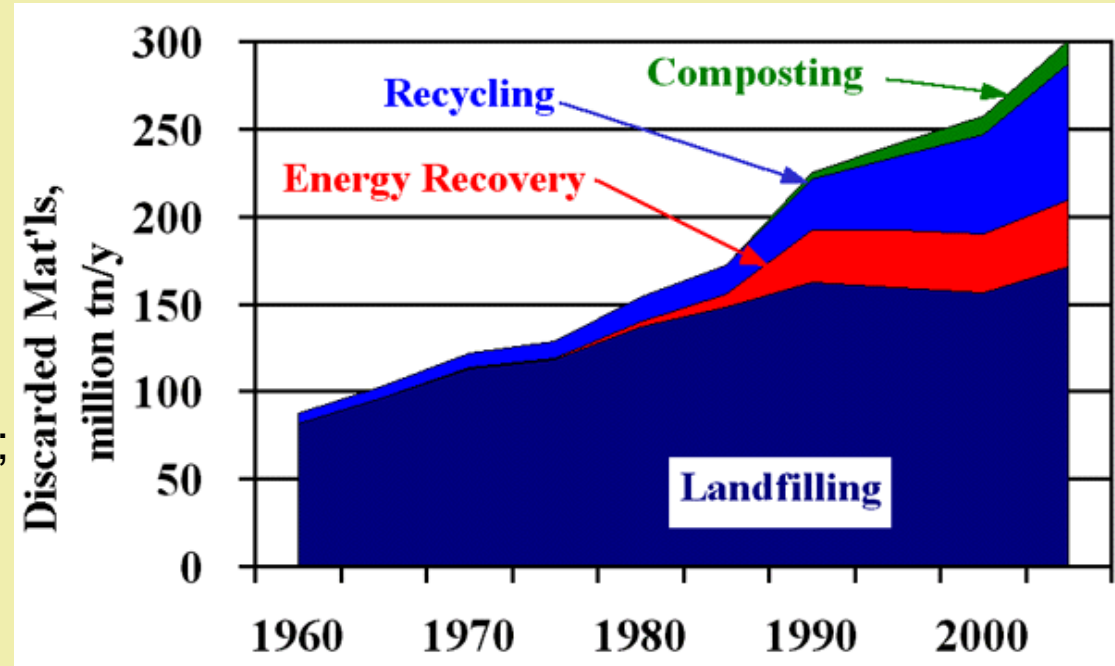


Source: Eurostat, based on data of yr 2010

The fate of the waste

□ USA

- ✓ ≈15% burned;
- ✓ ≈25-30% recycled / composted;
- ✓ the remaining (≈60 %) buried;



□ Hungary

- ✓ ≈85% deposited, but in Budapest only 40%, while 60% burned;

□ Japan

- ✓ ≈50% recycled!

Factors of increasing volume of settlement waste

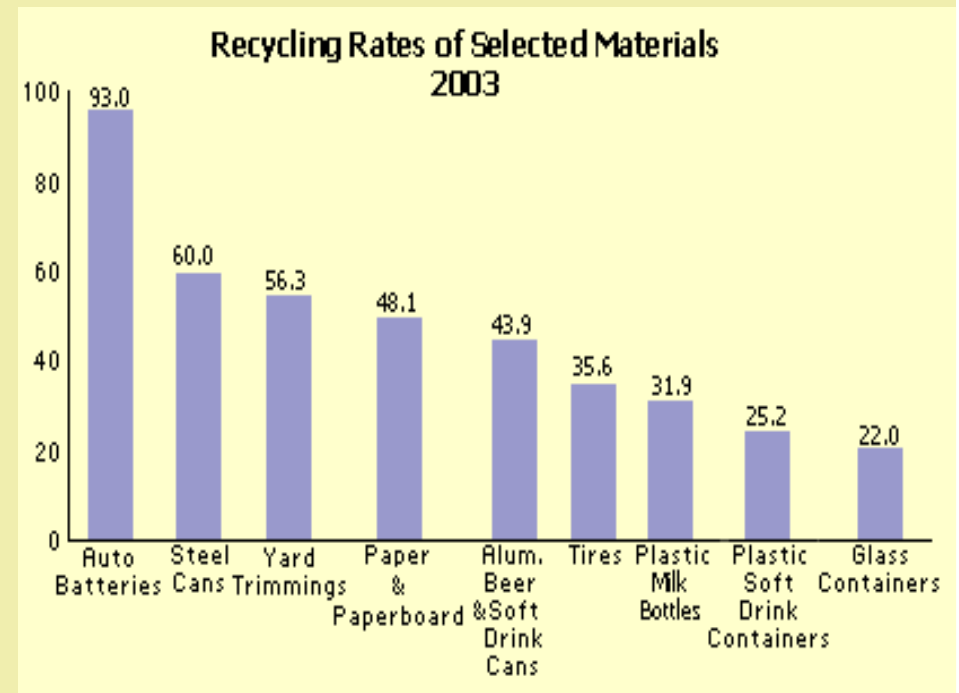
- Development of cities of large population;
- consumption of non-essential products;
- less durable products;
- disposable products and packaging;
- small percentage of reuse, recycling;
- no interest for reducing waste (e.g. cheap energy and land), or waste "management" is a good deal;

Strategies of reducing waste production

Three strategy

in order of importance, which is still opposite;

- **1. Input strategy:** reducing consumption and the amount of packaging materials, increasing durability;
- **2. Throughput strategy:**
 - reuse;
 - recycling;
 - 1 ton of recycled paper saves trees, and consumes 1/2-1/3 energy;
 - aluminum: 95% less energy;
 - ☐ USA: recycled
 - ✓ glass by 22%;
 - ✓ plastic by 25-30%;
 - ✓ paper by 48%;
 - ✓ aluminum by 44% less energy;



Difficulties of recycling

- The factories are built in producing new products, recycling technologies are still underdeveloped;
- The raw materials are sometimes even cheaper (see, e.g. paper – recycled paper), partly because environmental damages do not appear in the price of products;
- Difficulties of selective waste collection;

Hungary: *waste yards, waste islands*;

- public waste that can be transported into waste yards:

Recyclable materials

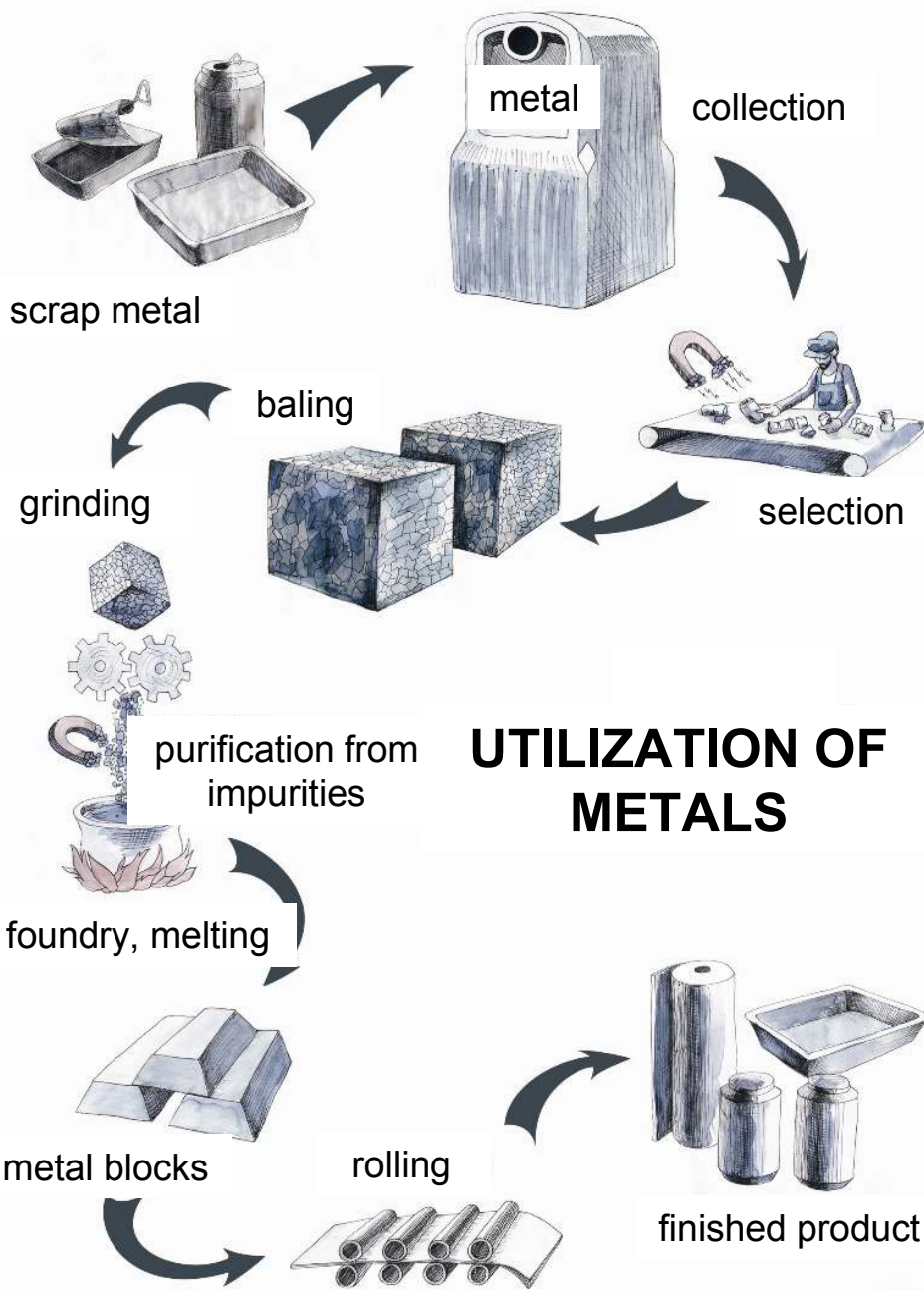
paper waste, glass waste, plastic waste, scrap metal, tires, textile waste; In Hungary, only approx. 3% (5 million tons) of municipal solid waste is used!

Hazardous waste

batteries, lead-acid batteries, festékes, paint and chemical packaging, used culinary oils, expired drugs, refrigerators and other electronic devices;

Other

construction debris, furniture, paint, green waste;



UTILIZATION OF METALS

Flowchart of separately collected wastes (1a)

Metals



PROCESSING OF SCRAP METAL



WASTE

PRODUCT

Letölthető a www.hulladekboitermek.hu oldalról.



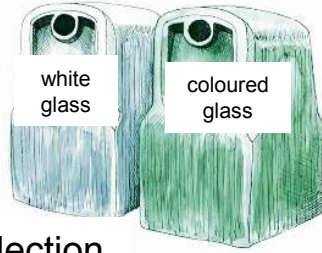
Flowchart of separately collected wastes (1b)

Metals, photos

waste glass



collection



cleaning

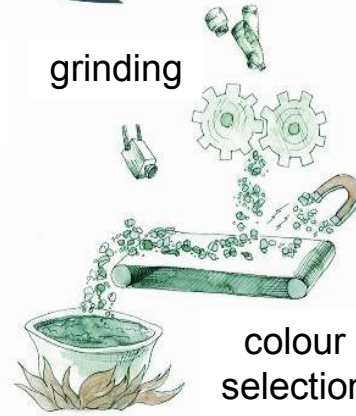


UTILIZATION OF
GLASS

glass products
packaging



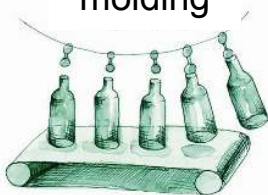
grinding



colour
selection

merging

molding



Flowchart of separately collected wastes (2a)

Glass

PROCESSING OF GLASS WASTE



A garatból érkező hulladékból először ki kell válogatni az üveghez bedobott más fajta hulladékokat



Adagolás a válogatómű garatába



Szelektíven gyűjtött "vegyes" üveg hulladék



Iparilag begyűjtött sörös üveg hulladék

WASTE

A törőgép után a szeparátor kiválogatja a szennyeződéseket



Kamerák és lézerek segítségével a szeparátor képes szétválasztani a színes- és a fehér üveget



Tisztítás után jöhet a színre válogatás



Az eredmény: tiszta fehér üveg!

PRODUCT



Flowchart of separately collected wastes (2b)

Glass, photos



Flowchart of separately collected wastes (3a)

Paper

PROCESSING OF PAPER WASTE



Papírpépből kiszűrt szennyeződések
(ha "tisztán" gyűjtünk szelektíven, kevésbé rongáljuk a gépeket és gazdaságosabb lesz a feldolgozás is!)



A papírpépet előállító "pulper" és az alján lévő keverőlapát



Tárolás



Bálázott kartonpapír hulladék érkezett

WASTE



A gyártási adatok mindig szem előtt!



Legyártott dobozkarton



Dobozfeliratok nyomtatása: "branding"



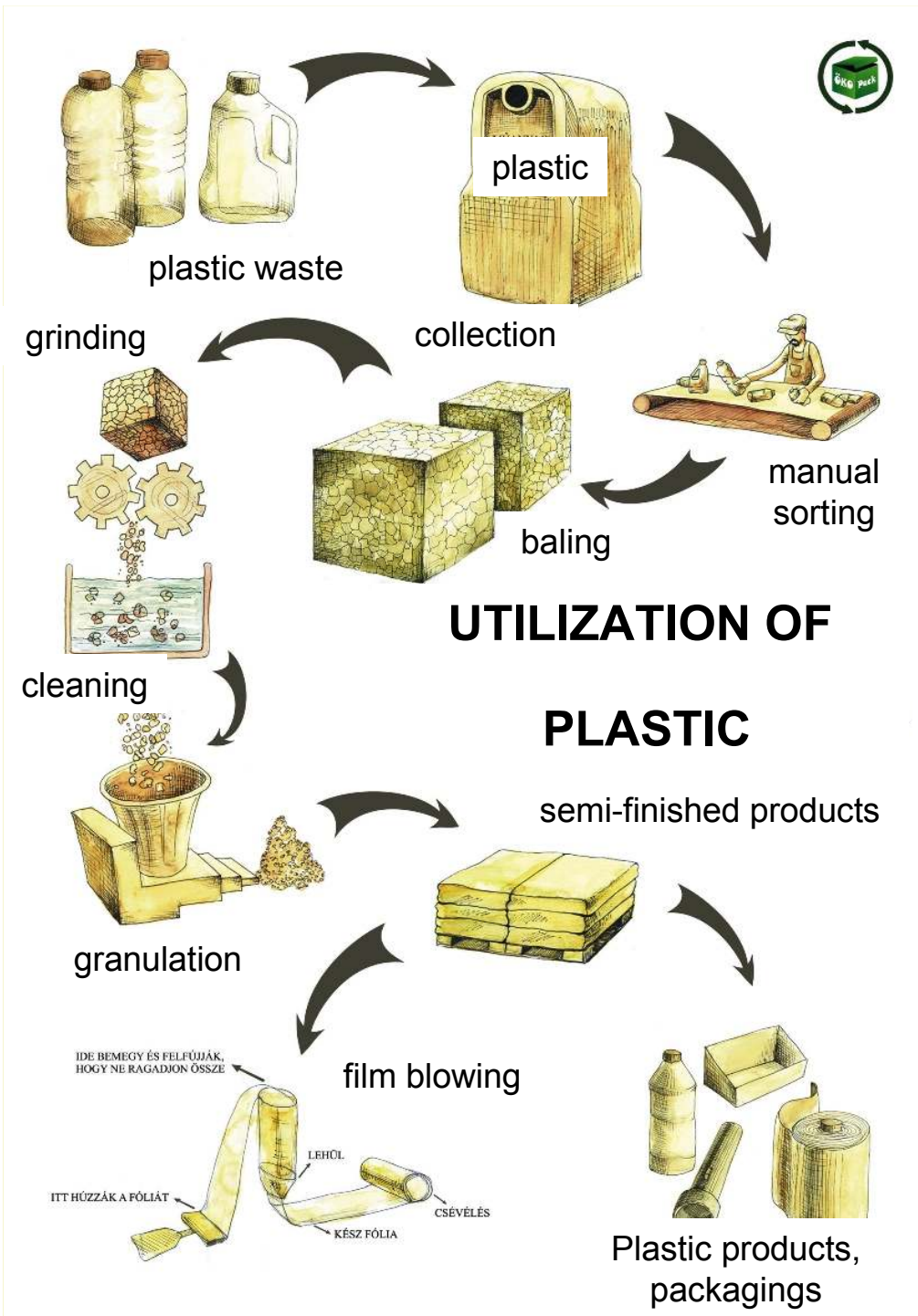
Kész dobozok: Hulladékból Termék

PRODUCT

Flowchart of separately collected wastes (3b)

Paper, photos





Flowchart of separately collected wastes (4a)

Plastic

PROCESSING OF PLASTIC WASTE



Flowchart of separately collected wastes (4b)

Platic, photos





Flowchart of separately collected wastes (5a)

Rubber

Selective waste collection in Budapest ("The waste is not lost, only transformed")

- ❑ **2000: ~500 thousand tons**, the bulk of it is industrial collection;
distribution: **metal: 350 thousand tons; paper: 150 thousand tons;**
plastic: 5 thousand tons; hazardous waste (especially batteries): 3.3
thousand tons; green waste: 2.5 thousand tons;
- ❑ Budapest: **~80-100 waste-receiving space** (especially non-ferrous) +
≥10 residential waste yard on site (*Fővárosi Közterület-fenntartó RT*,
i.e. Municipal Public Land Maintenance Ltd, www.humusz.hu);
- ❑ Waste yards: a few hundred tons/year, weight percent:
paper: 50-60 tons/year; glass: 30-40 tons/year; metal, batteries,
appliances: 3-5 tons/year;



3. Output strategy:

as efficient and environmentally friendly storage / disposal as possible;

❑ Landfill:

suitable land, earthworks, construction, insulation, compression, maintenance and management of developing biogas;

➤ USA

disposal into the sea, etc;

➤ Hungary

2002: **≈750** deposits, of which **<50 (!) appropriate** in long term, **≈130** are appropriate until 2010, + approx. **2000** closed or unlicensed or illegally operating landfills. **OHT**: aim → 100 deposits by 2010!

✓ Budapest

40% of all domestic waste: →

a) deposit at Dunakeszi, partial capacity: 1/5 (almost full),

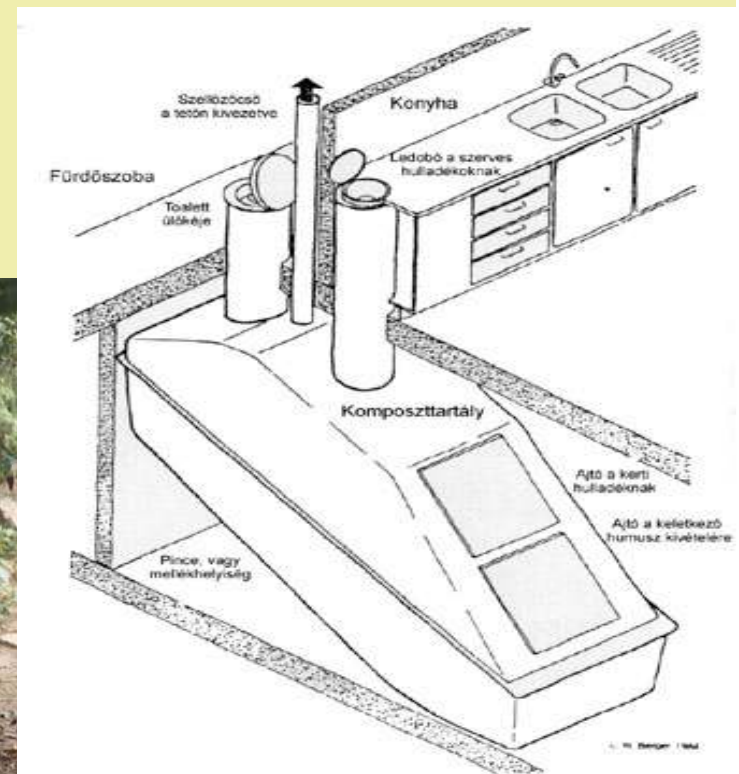
b) deposit at Pusztazámor, partial capacity: 4/5 (it absolute capacity: 66 million m³, planned for 50 years);

❑ Composting:

Aerobic decomposition of organic material - manuring.

Europe: Benelux States, Great Britain, Italy, Israel.

- ✓ Disadvantages of large-scale farming;
- ✓ Benefits of backyard farming.



□ Burning

- the amount of waste is decreased by 2/3 of its original volume + heat and electricity are produced.

USA: 15%; Sweden, The Netherlands 30%; Denmark: 60%.

USA: 1 ton of waste \approx 1 barrel (159 litre) oil;

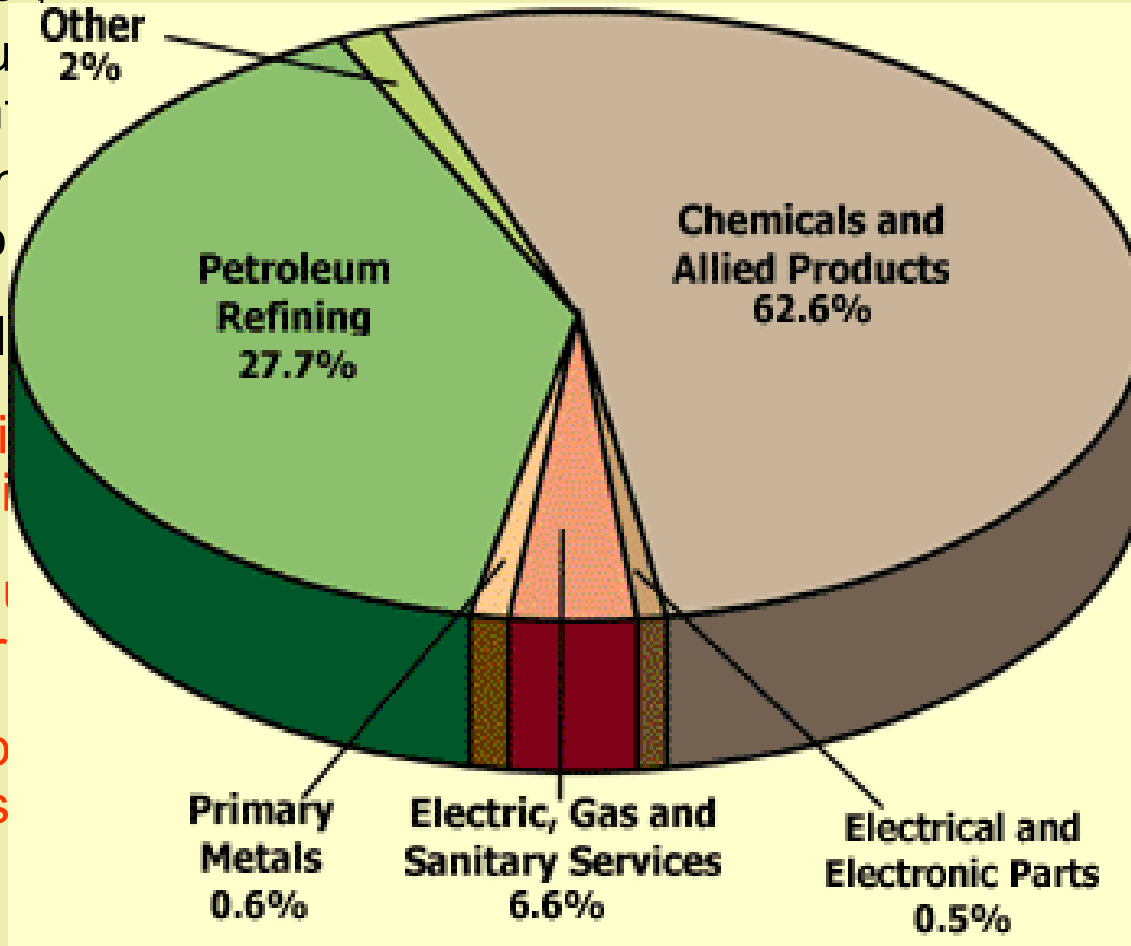
- **Problems:** some of the useful materials also burn, the ash / slag should be deposited \Rightarrow hazardous waste (e.g. heavy metals);
- Selective waste incinerators; expensive operation \Rightarrow planned for more settlements \Rightarrow new problems;
- Hungary: 1 residential incinerator: **Rákospalota**. Renovated in 2005; passing with annual capacity of 350-400 thousand tons;



Production waste

- The society is less confronted with it - "behind the factory gates":

- In Hu
quan
- A mir
corro
- Its cl



higher

explosive,
materials;

waste,

**Types and source
of hazardous
waste in the USA**

waste,

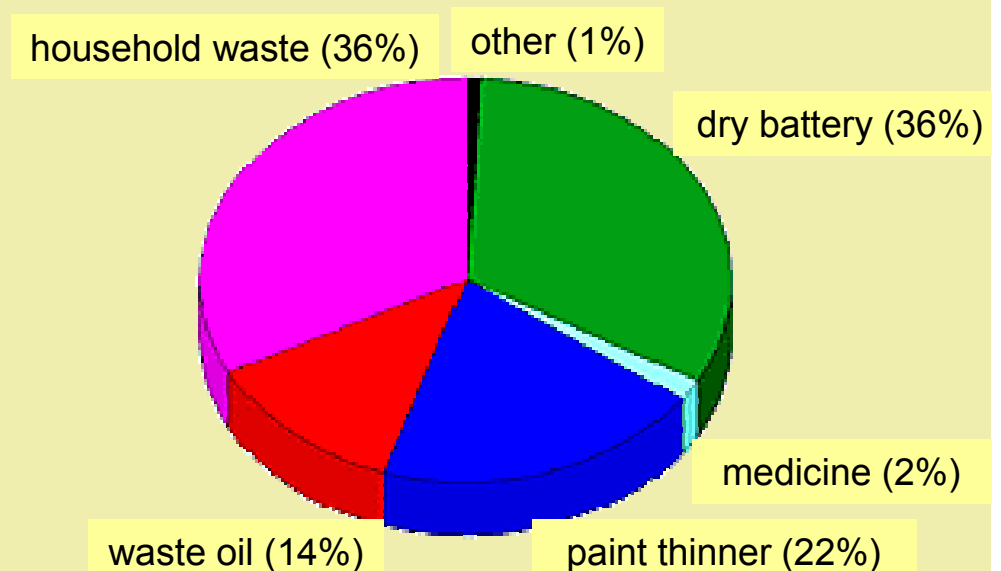
I. pestici
hospi

II. red sl
deter

III. oily p
glass

Production waste in Hungary

- **Industrial waste**
(mining tailings, metallurgical slag, sludge, fly ash, oil refining waste, etc.) ≈20-40 million tons;
- **Agricultural waste**
35 million tons, of which 30 million tons of **bio-waste** and 5 million tons of **food, meat waste and food waste sludge**;
- **Hazardous waste**
≈5 million tons, of which **red mud** (alkali metal oxides from aluminum production): 0.8 million tons; **processing industry - food industry**: 1.5-1.5 million tons; **power plants, incinerators** burn residues: 1 million tons;
- **factories, plants**: ≈70-100 million tons of hazardous waste !
- A very small part of it **household hazardous waste**:



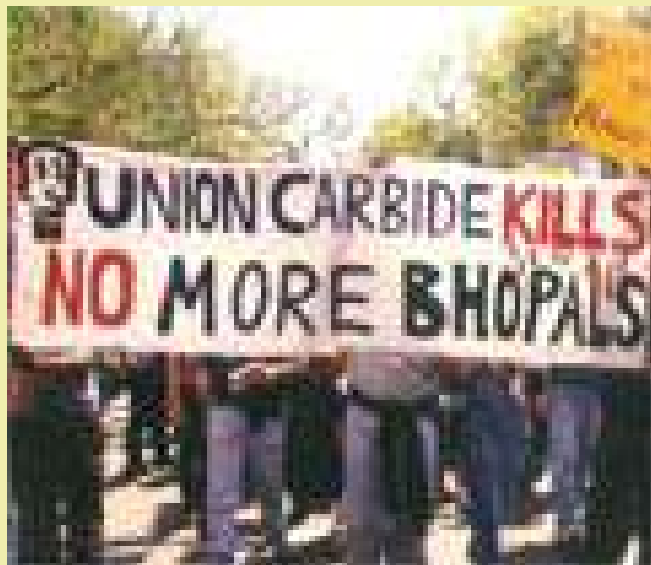
- **The fate of the waste:**
 - ✓ 15-20% → incinerators;
 - ✓ 50% → recycled;
 - ✓ the rest → landfilled;

The fate of hundreds of thousands of tons of hazardous waste per year is unknown!

- 1988: **Monorierdő**: the wells were contaminated \Leftarrow **materials of chromium content** were buried;
- 1989: **Kiskunság National Park**: since 1982, 10 thousand barrels of **pharmaceutical factory and paint waste** have been buried;
- 1980s: **Garé landfill**: Budapest Chemical Works deposited 65 thousand barrels of chlorinated benzene (waste from herbicide manufacture) \Rightarrow leaked into the soil; 1999-2001: 17 thousand tons of wastes were transported into German and Austrian incinerations + \Rightarrow since then land has been contaminated in Garé;
- 1990s, **Vác**: **chemicals leaked into the waters** at Chinoin factory site;
- 1990s, **Üröm**: at the Metropolitan Landfill of Fővárosi Gázművek (Budapest Gas Works) **cyanide leaked into the soil**;
- 2000s, **Austrian tanneries**: **foaming of the River Rába and other border rivers**;

USA

- According to federal standards 50-70 million tons/year, while according to state standards 200 million tons/year hazardous waste, from which ≈ 40 million tons/year is out of control;
- 1970s: the Love Canal affair;
- thousands of similar landfills in the United States :
 - ✓ contamination of drinking water and groundwater;
 - ✓ habitat destruction;
 - ✓ spreading diseases;
 - ✓ a huge financial burden on society;
- The world's largest chemical misfortune, 1984: Union Carbide chemical factory in Bhopal (India), 24 tons of methyl isocyanate, 2500 dead, 80-100 thousand people were injured;



Hazardous waste management strategy

- **Legislation:** prevention, penalties, fines. Hungary: 1995 LIII. **Environmental law**, 1995 LVI. LAW on **product fee of environmental protection**, 1995 XLII. LAW on compulsory mobilization of local public services, Govt. Decree of no. 102/1996 on **management of hazardous waste**, decrees in 1996 on their **transport, regulations, dispose**, 2000: **waste management law**.
- **Export:** practices still existing \longleftrightarrow most countries prohibit (also Hungary!). Worldwide: million tons of order of magnitude per year!
- Hungary, 1980s: waste imported from Austria, Germany, export to former socialist countries to the east;
- Strategy followed by in practice: **disposal / destruction technologies;**
 - **improvement in technology, use:** at the point of origin;
 - **conversion, disposal:** the physical transformation / destruction, acid-base neutralization, oil-water separation, low temperature heating, breakdown, etc;
 - **burning:** Hungary: incinerator at Dorog (severe drinking water pollution in 2004!), Garé, Rudabánya: only planned. Another 30 smaller incinerators, currently with substantial transformations (EU standards). Austria, Denmark, the Netherlands, Norway, Belgium, Sweden: **incineration tax**.
 - **landfills:** in Hungary officially: Aszód, + regionally: Nyíregyháza, Eger, Hernádkércs, Balmazújváros + smaller local landfills (over 30). Small and medium-hazard waste: different standards;

Management of radioactive waste

- High-hazard waste:
 - spent fuel;
 - biological, experimental waste;
- Final disposal has not yet been in the world!
- Püspökszilágy, Hungary: lower-level radioactive waste (no longer in operation), the fuel is "stationed" at Paks (formerly brought back to the Soviet Union / Russia).
- High-hazard fuels: conceptual placement – worldwide at atectonic area, in water-through-non-permeable rocks (e.g, granite, salt mass, clay), in concrete- or glass rind.
- Hungary: until 2049(?) – disposal of fuel cells from Paks " should be resolved" (researches: aleurolit at Boda area). Small and medium-hazard radioactive waste disposal: Bábaapáti, 2009.
- Federal-state conflicts in the USA: „Not in my backyard”;
- Serious challenges over time: as the life cycle of nuclear power plants is only a few decades, the waste should be placed somewhere.

Classification of the waste

According to consistency:

- solid;
- liquid;
- gas;

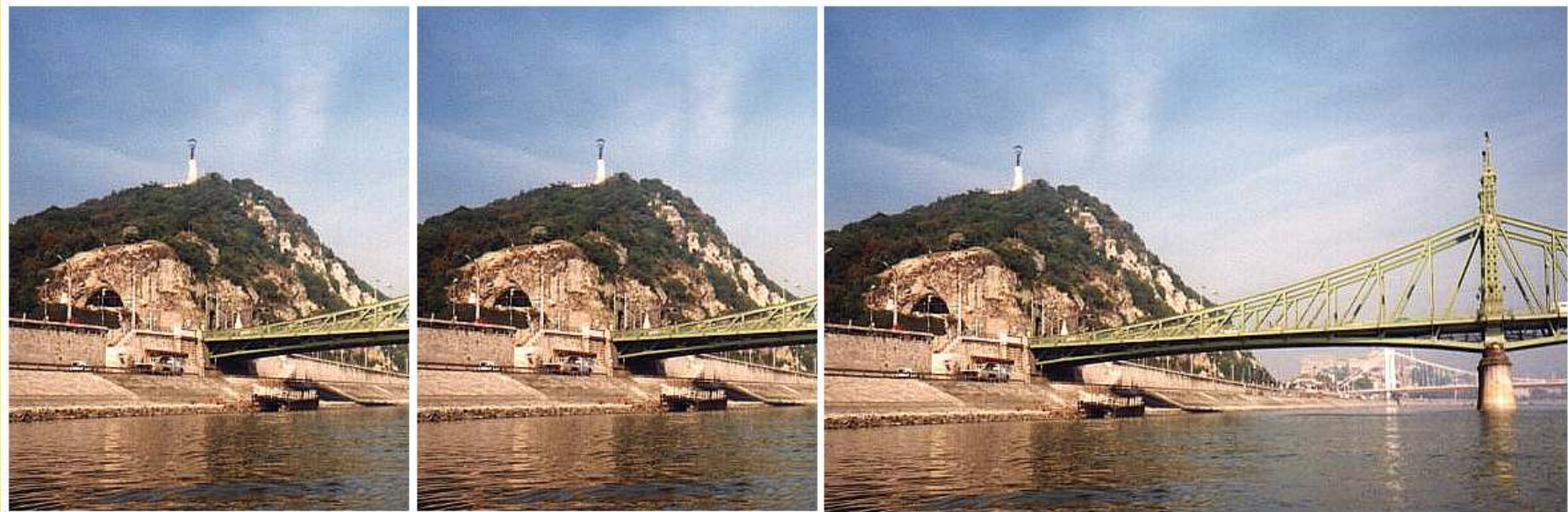
According to place of origin:

- production (industry, agriculture);
- municipal (household, institutional);

According to hazard:

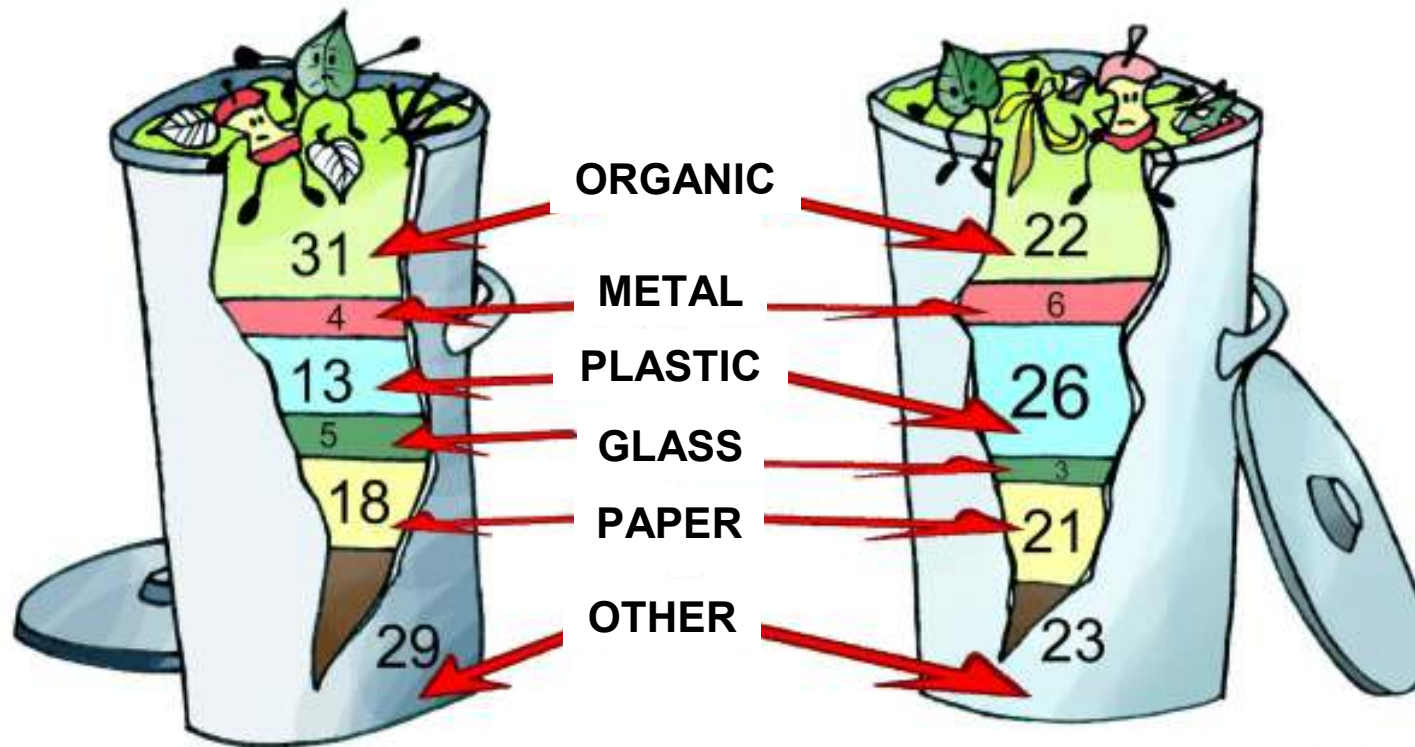
- dangerous (immediate environmental hazard);
- non- dangerous;

In Hungary, during a year...



...3 Gellért mountain of garbage is generated!!!

COMPOSITION OF HOUSEHOLD WASTE



Mass percentage (%)

Volume percentage (%)

Prevention (1)

**Impact of advertising,
environmentally responsible
purchasing, packaging materials**

Priority order of the waste management

1. Prevention;
2. Re-cycling;
3. Re-use;
4. Disposal
(burning, landfill);



Waste reduction

- ❑ Critically deal with commercials!
- ❑ Buy with environmental awareness!
- ❑ Examine the packaging!
- ❑ Look for eco-friendly products!
- ❑ Prefer local, domestic products!

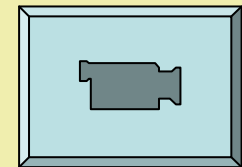
TESCO

gazdaságos

Háttér

Critically deal with commercials!

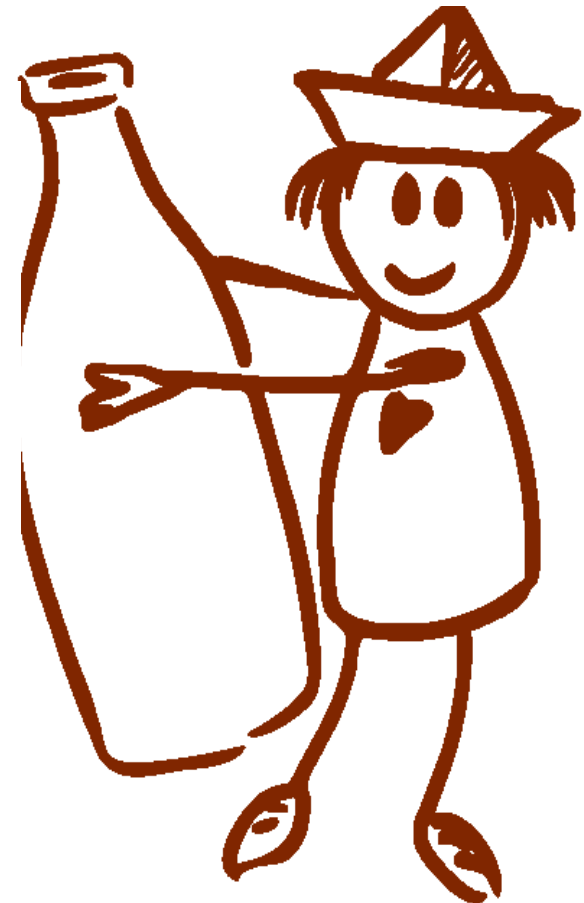
- ideal notions are connected with products to be sold;
- it impacts emotions and instincts;
- it gives the appearance of science;
- promotes with popular people;
- the importance of the brand – to highlight from similar products;
- it encourages overconsumption;
- promotion, buying, local advertising;
- junk mail;
- do not fall for the actions and prize games!



Eco-friendly shopping

When purchasing, let you also be a friend of your environment

- ✓ Think ahead to what you need!
- ✓ Do not fall for advertisements and actions!
- ✓ Buy at market and small shops and not in supermarkets!
- ✓ Take along a basket or bag and do not accept plastic bags!
- ✓ Avoid overpacked products!
- ✓ Buy durable, repairable things, avoid disposable products!
- ✓ Select returnable products!
- ✓ Do not buy products with disposable package!



Let's go shopping trip!


**NE ESS PÁNIKBA,
MI NYITVA VAGYUNK!**



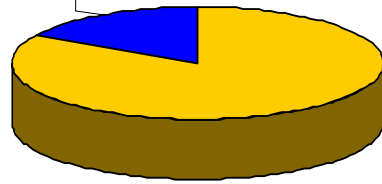


Price of packaging in the product price, %

disposable PET bottle drink, 0.5 litre

17%

83%

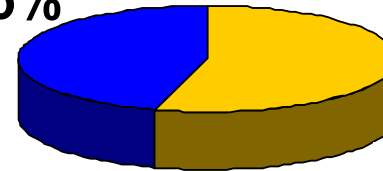


price of the drink
price of the packaging

aluminum boksza drink,
0.33 litre

45%

55%

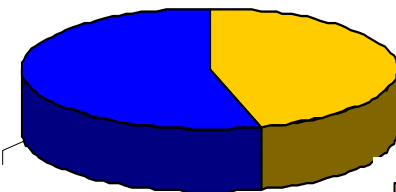


price of the drink
price of the packaging

tetrapack drink, 0.2 litre

45%

55%



price of the drink
price of the packaging

Packaging materials (1)

- **The age of home storage (until the beginning of the 19th century)**
 - self-sufficiency;
 - delivered goods: grain, dried fruit, wine, suet, spices;
 - barrels, boxes, wood and pottery, granary;
 - glass (first industrial packaging manufacturing) - wine – huta (glass smelting);
 - main function: storage;

Packaging materials (2)

□ The age of industrialization (19-20th century)

- food processing level is increasing;
- preservation: milk, meat, vegetables, fruit;
- milk in glass, pasteurization;
- Canned bottles;
 - ✓ 1882: Manfred Weiss - first canning factory in Hungary;
- tinned cans;
- paper (chocolate, meat, butter);
- manufacturing of corrugated paper (19
- Storage + shipping + durability;



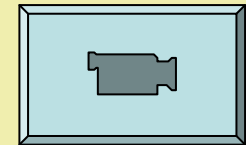
Packaging materials (3)

- **Bulk use, "all packaging" period (since the middle of the 20th century)**
 - penetration of glass, cans, paper;
 - appearance of plastic-based packaging;
 - the middle of the 1960s: dairy, preservatives, vegetable oil industry (products in disposable jars, cans, mini-jams);
 - aluminum foils;
 - 1968: paper, cardboard, plastic & glass;
 - large-scale redemptions (boxes, egg boxes, medicine bottles, metal drums, carton);

Packaging materials (4)

□ Post-transition period

- good character of packaging is amplifying;
- manufacturers, trade interests;
- advertising, sales promotion;
- termination of redemption systems;
- spreading of plastics;
- over-packaging;
- 800 000 tons / year;



Our lifestyle and waste production

- We will pay for everything!

Product = 100%

Value = 10 - 40%

+ advertisement

+ packaging

+ transport

60 – 90%

The Earth is running out!



Pay attention to packaging! (1)

- **One-way systems**: they get immediately in the trash \Rightarrow a lot of energy, raw materials and money wasted;
+ environment is also loaded!
- Their manufacturers do not take any responsibility for the waste they have created;



Pay attention to packaging! (2)

- **Multi-way systems:** no waste production \Rightarrow good for the environment
 \Rightarrow good for the customer;
 \Rightarrow **not good for the producer;**
- **Example:** a returnable glass 40-60 times rechargeable and recyclable again;



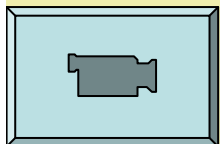
Packaging types

PAPER

- demand for raw materials: 1 ton of paper \Leftarrow 2.0-3.5 tons of wood;
- each year the world loses a forest area that covers the area of Greece
 - ⇒ termination of habitats;
 - ⇒ change in water flow;
 - ⇒ change in carbon cycle;
 - ⇒ albedo changes;
 - ⇒ desertification;
 - ⇒ soil erosion;
- Energy consumption: paper industry accounts for 4% of the world's energy consumption;
- water use and water pollution;
- save paper!

Returnable GLASS

- 40-60 times rechargeable;
- you do not always have to manufacture a new one;
- waste is not generated each time;
- reload and switch back;
- debates on deposit;



PLASTICS (1)

- their raw material is oil that is a finite energy resources;
- when manufacturing, many harmful additives are used;
- when burning, it is carcinogenic; harmful substances occur impairing respiratory system, nervous system and internal organs;
- they do not decompose for hundreds of years;
- their returnable version is refillable 6-10 times!

PLASTICS (2)

- **Polyethylene** (PE, HDPE, LDPE):
non-toxic, with chromium-containing catalyst and nickel-containing sunscreen, as well as toxic antioxidants and carcinogenic flame retardant (pipes, sheets, trash cans);
- **Polyethylene terephthalate** (PET) and PRB):
non-toxic, it can be recycled, not flavour neutral, it has a large volume;
- **Polypropylene** (PP):
it could be recycled, yogurt boxes, margarine boxes;
- **Polystyrene** (PS):
its raw material are dangerous poisons; resistant to alkali, but it is attacked by organic solvents; photoactive; foam trays, heat and sound insulating boards, coolers;
- **Polyvinyl-chloride** (PVC):
the most dangerous plastic; during manufacture, in use and disposal it pose a threat; it is dissolved by acid; high risk of leaching also for foods;



in boxes:?

7: bisphenol-A BPA-

Meaning of numbers at the bottom of PET bottles

1: PET/PETE – Polyethylene terephthalate

products: soft drinks, mineral water bottles, cups, as well as bottles of domestic drugs and toiletries;

2: HDPE – high density Polyethylene

products: toys, milk bottles, detergents, cleaning products, shampoo, motor oil bottles;

3. V or PVC – Polyvinyl-chloride

products: tubes, bottles, bottles of household oil;

4. LDPE – Low Density Polyethylene

products: films, bags;

5: PP – Polypropylene

products: bottles, cans of yogurt and cream cheese, boxes of other dairy products, bottles of mustard, ketchup; plastic containers, trays, flasks, bottles for household products;

6: PS – Polystyrene

products: coffee cups, food boxes, boxes of yogurt and other dairy products;

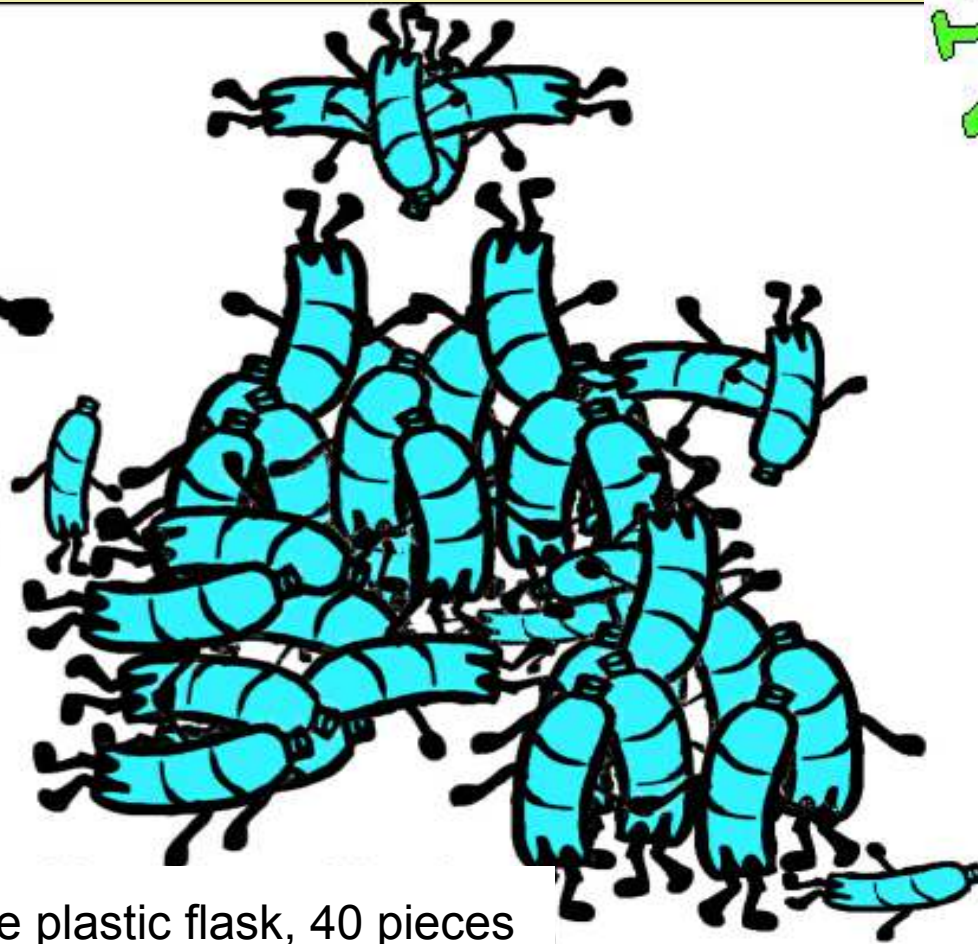
7: BPA- Bisfenol-A

Compare!

Returnable



Returnable
bottle
(1 piece)



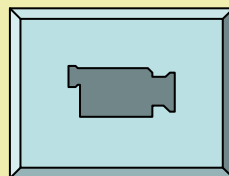
Non-returnable plastic flask, 40 pieces



Returnable

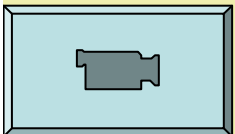
ALUMINUM tin

- bauxite mining is severely harmful to the environment;
- 1 ton of aluminum (4-5 tons of bauxite) 2-3 tons of red mud;
- 1000 Ah current produces 0,3354 kg aluminum;
- 500 million piece/year;
- 40-50 HUF;



COMBI PACK

- 5% of metal, 10% of plastic, 85% of paper;
- Its layers can not be separated;
- Its manufacture is energy-intensive and water polluting;
- Beautiful, coloured waste;
- 1,6 billion piece/year;



Regulatory background

- January 1, 2003: **Government Regulation on Packaging Waste** - a 50% return rates, with 25% of material re-utilization, on type of material minimum 15%;
- Öko-Pannon Kht: a company, organized on a market basis, coordinating collection and recovery - license fee;

- **Problems:**



- no regulations on emission rates;
- looking for loopholes to access product fee waiver;
- lack of state control;
- conflation of associated and homogeneous packaging materials;
- Hungary has undertaken the fulfillment of the quota;
- the aim is not fulfilling the task, but "getting over" it;
- mostly recovery of industrial packaging waste occurs, while recovery of public packaging waste has not been solved;



Regulation on deposit

- it could have been into effect on January 1, 2003 but has not yet been born;
- while rapidly disappearing returnable packaging products;
- goal: mandatory redemption rates on corporate (not industrial!) level;
- stressing the obligation of keeping in commercial range;
- sanctions in case of non-performance: total emissions should be made of deposit;

Pay attention to packaging!

Avoid one-way, namely **DO NOT BUY:**

- ☹ **Canned drink;**
- ☹ **Disposable products of PET bottled soft drinks and mineral water;**
- ☹ **Pre-wrapped cold cuts, fruit and cheese;**
- ☹ **Combi-box packaged goods;**
- ☹ **Unnecessarily plastic bags;**
- ☹ **Disposable items!**

Look for multi-way, namely **CHOOSE:**

- ☺ **Returnable glass or plastic;**
- ☺ **The least amount of packaging way;**
- ☺ **Cold cuts and cheese weighted at the counter;**
- ☺ **Bio-vegetables and fruits at the market;**
- ☺ **Fresh, rather than preserved;**
- ☺ **Durable, repairable products!**

Prevention (2)

Eco-friendly indications?!

„Sessile oak” (cedar)

- “Products and technology having proven favorable environmental characteristics than the traditional”;
- The Ministry of Environmental Protection and Regional Development regulated using the system of distinguishing marks “environmentally friendly conditions” with a decree of No. 29/1997 (VIII.29.).
- The Environmentally Friendly Products Public Company is responsible for ensuring coordination with the operation of the rating-system certification.
- Applications are voluntary, its examination is the task of of the Certification Commission. The award to trademark law, the Minister of Environment decides on the proposal from the Commission.
- **The award may be obtained for 3 years, but one have to pay for the trade mark application, submitting, benefits do not go and do not have proper communication side.**
- <http://www.kornyezetbarat-termek.hu>



„Der Blaue Engel“ (Blue angel)

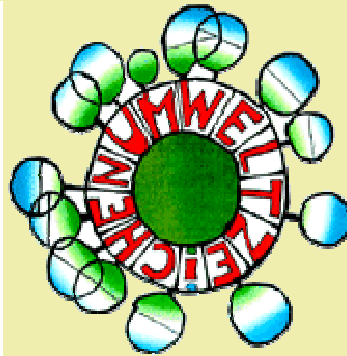
- the oldest label (1977);
- for distinguishing positive environmental properties of products and services;
- The "Blue Angel" is displayed on the product or service, or typically for services - in the showroom poster;
- Federal Environment, Nature Conservation and Nuclear Safety Administration (BMA).
- <http://www.blauer-engel.de>



„Euro-flowers”

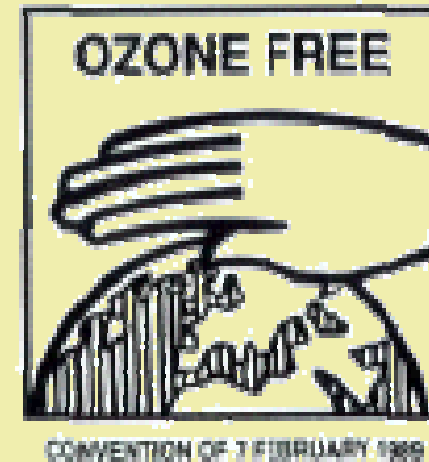
- The EU's eco-friendly product quality certification system (Eco-Labeling Scheme) was established by the decree no. 880/92 / EEC (Council) Regulation. It introduced the "Euro Flower" brand, with the twelve stars flower petals.
- It is used since 1993
- Countries of the European Union + Norway, Liechtenstein, Iceland.
- Products, services, merchants.
- It simplifies and makes the system more transparent, with the same criteria.
- It can be used in parallel with the national label.
- Recently, more than a hundred product qualifies for the EU eco-label in Hungary.





Eco-friendly product quality certification schemes in different countries

"Environmentally friendly" markings used by manufacturers



Misleading indications



It is not all the same that it was made of
"recyclable" or "recycled" material.

Green dot (Der Grüne Punkt)

- The **PRO EUROPE** began its operations in December 1996, in Brussels.
- It provides permission for the use of the **Green Dot** mark on the basis of uniform rules for organizations coordinating officially recognized recycling of packaging waste in given countries.
- May 2001 -: In Hungary, it is also possible to use the **Green Dot** mark, which **symbolizes that a manufacturer which contracted Öko-Pannon Public Company, pays for package of his products so that they are re-collect and recycle.**
- The existence of a sign **does not mean that the product is more environmentally friendly** than any of the same product!



Prefer local, domestic products!



Possibilities in school

- Use of recycled paper!
- Save paper!
- The school cafeteria should sell disposable flacon beverages, plastic utensils!
- Do not allow the machines!
- At events returnable beverage bottles should be sold!
- Applications;

Selective waste management and recycling

Reuse - recycle

- without modification, reuse for the same or different purpose;
- E.g. deposit glass, or other useful tips;
- The specific product, packaging
 - ✓ is used as a secondary raw material;
 - ✓ Is recycled in its material;
 - ✓ the original function is altered or is completely changed;
- Requirement: **selective waste collection;**

Selective waste management

- ❑ Waste collection, waste yards:
Glass-plastic-paper-metal;
- ❑ Organic substances –
composting;
- ❑ Hazardous waste;

COMPOSITION OF
HOUSEHOLD WASTE



**Waste collecting islands:
plastic – paprr – glass**



Reduce waste by composting

Compost - man-made mold, which contains essential nutrients for the plants.

- 30-35% of the household waste is organic matter;
- It deteriorates at the landfill, methane is produced \Rightarrow stinking;
- It reduces the efficiency of combustion in the incinerator;
- Soil drainage, waste reduction!

Why compost is good for the soil?

- plants can take up easily nutrient content of humus in the compost;
- improves the soil structure, which helps its aeration;
- its dark color helps the soil warm up;
- it has good water binding capacity ⇒ improving the water balance of the soil;
- increases biological activity of the soil;



What can get into the composter?

From the kitchen and the household:

- ✓ vegetable waste from cleaning, withered plants;
- ✓ egg shells, coffee and tea grounds;
- ✓ peat, wood ash (at most 2-3 kg/m³);
- ✓ excrement of plant-eating small animals with bedding shavings;
- ✓ paper (tissue paper, egg boxes shredded);
- ✓ wool, cotton and linen (well chopped);

From the garden:

- ✓ leaves, straw, twigs, branches (cut);
- ✓ grass clippings, garden weeds;
- ✓ fallen fruit;
- ✓ farmyard and poultry manure;
- ✓ wood chips, sawdust;



What cannot get into the composter?

- ✘ paint, varnish, oil and grease residue;
- ✘ synthetic or non-biodegradable materials (plastic, glass, tile, metal, vacuum cleaner collection bags);
- ✘ leftovers, meat, bones - although they decompose, they are not placed in the composter because of stray animals, rodents and flies spreading infection;
- ✘ infected, diseased plants;
- ✘ badding of carnivorous animals – also because of the risk of infection;



Steps of composting (1)

1. Collecting

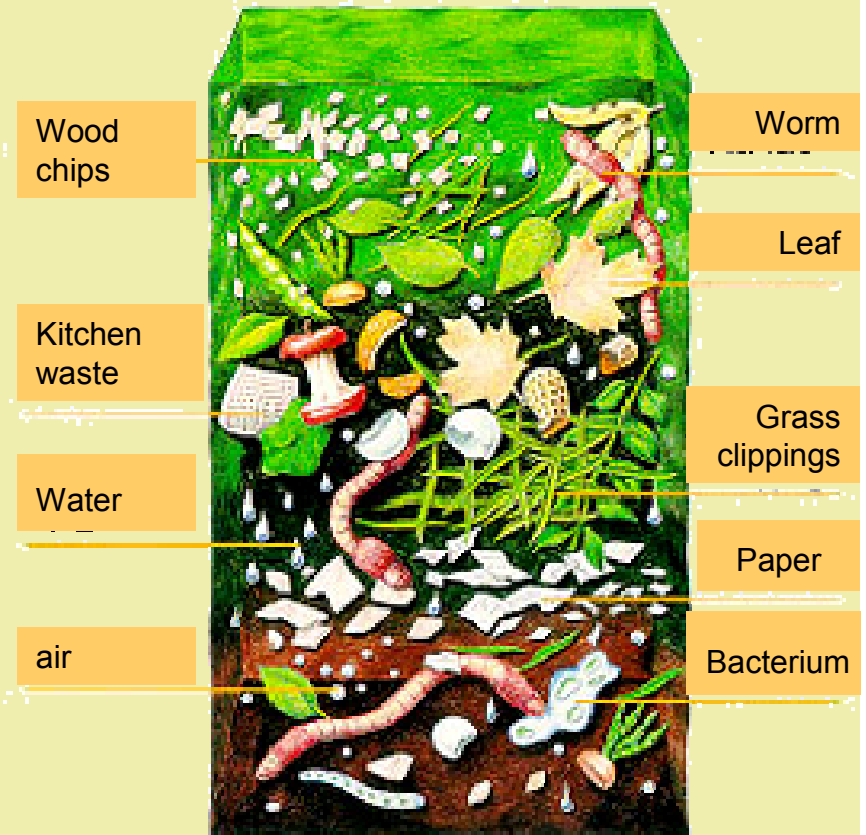
For collecting kitchen green waste, use a sufficiently large container, preferably with a lid, it is recommended to defecate into the composter once a day in the summer and once a week in the winter.

2. Grinding

For the sake of faster decomposition, it is recommended that the material to be composted be chopped into pieces smaller than 5 cm.

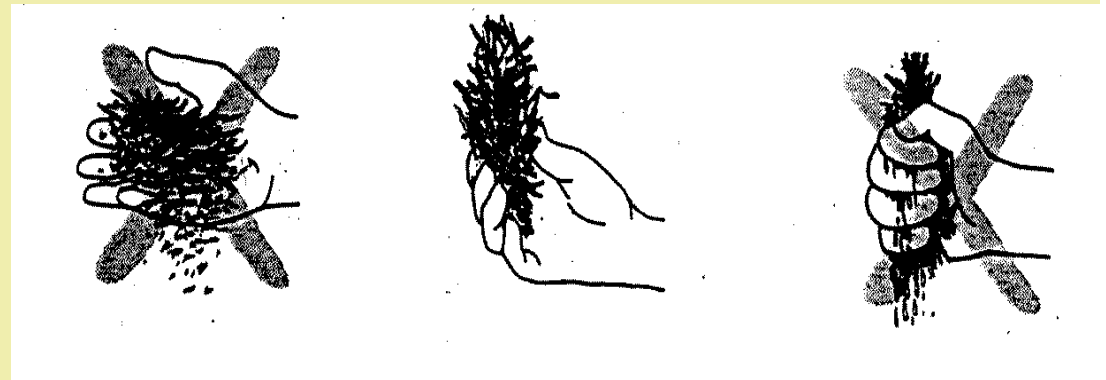


Steps of composting (2)



The main rules of composting

- chop the ingredients into pieces smaller than 5 cm;
- good oxygen supply;
- optimum moisture content;
- adequate nutrient content (C / N ratio);
- use as many kinds of raw materials as possible;
- for the sake of faster ripening of the compost, mix for 6-8 weeks;



For what using compost?

- ❑ Compost can be mixed to all planted land.

- ❑ It can be used for
 - ✓ garden soil reclamation,
 - ✓ cultivation under plastic,
 - ✓ flower planting,
 - ✓ vegetable bed,
 - ✓ tree planting, taking it into the hole,
 - ✓ flat pots balcony box,



Treatment of hazardous waste

Hazardous waste in the household (1)

Hazardous waste in the household	Why harmful?	What can we do?
Worn-out cooking oil, fat	<ul style="list-style-type: none"> • during baking harmful (carcinogenic) compounds are formed • in soil they cut off water or mineral uptake of the plants through the roots • they cause drain blockage • they can not be disposed either in sewage treatment plants 	<ul style="list-style-type: none"> • collect them separately • cooking methods without oil • <i>DEROLIN</i> – an oil sewage application
Medicines	<ul style="list-style-type: none"> <input type="checkbox"/> Expired medicines are poison! <input type="checkbox"/> their chemical ingredients can react with other materials at landfill <input type="checkbox"/> getting into soil and ground water can cause severe poisoning 	<ul style="list-style-type: none"> <input type="checkbox"/> only use medicine if needed <input type="checkbox"/> do not store medication unnecessarily
Batteries	<ul style="list-style-type: none"> • their manufacture causes environmental pollution, contain heavy metals (mercury, cadmium, zinc), that releasing poison the soil and ground water 	<ul style="list-style-type: none"> • replace with rechargeable batteries • recharging can be solved by solar energy, battery or by mains-operated chargers
Fluorescent lamp, thermometer	<ul style="list-style-type: none"> • contains mercury, which is one of the most dangerous heavy metals 	<ul style="list-style-type: none"> • choose ones long life, so at least less hazardous waste will be generated in our home
Household chemical products, toiletries, detergents, etc.	<ul style="list-style-type: none"> • just like drugs, these chemical and colouring agents of them can also become toxic when mixed with other chemicals, so residues of these substances are also considered hazardous waste. 	<ul style="list-style-type: none"> • employ natural-based cosmetics • Use: Laundry - washing soda, laundry soap Cleaning - baking soda Disinfection, descaling - vinegar

Hazardous waste in the household(2)

Hazardous waste in the household	Why harmful?	What can we do?
Worn-out cooking oil, fat	<ul style="list-style-type: none"> • problem, see: cooking oils • their packaging is also hazardous waste 	<ul style="list-style-type: none"> • improve the car in service, the waste generated should be placed in a barrel for this aim at the gas pump
Batteries	<ul style="list-style-type: none"> • comprises lead and sulfuric acid. If the lead gets into the soil and from there into the food chain it casus irreparable health damage, fetal malformations, brain lesions, developmental delays. 	<ul style="list-style-type: none"> • buy durable • used batteries can be deposited in most petrol stations
Pesticides, insecticides, fungicides, herbicides	<ul style="list-style-type: none"> • they are poisons of major environmental hazard 	<ul style="list-style-type: none"> • use them with moderation, and preferably seek environmentally friendly alternatives • organic farming
Crafting materials (paint, solvents, thinners, varnishes, etc.)	<ul style="list-style-type: none"> • they contain substances seriously harmful to the health 	<ul style="list-style-type: none"> • their packaging material is also hazardous waste, so it is important collecting them separately • employ environmentally-friendly products
Electronic equipments	<ul style="list-style-type: none"> • IT and telecommunications equipments, data storage discs, telephone, etc. contain heavy metals and are therefore treated as hazardous waste 	<ul style="list-style-type: none"> • if possible, have them repaired • in the case of a new purchase of buy a durable one

Selective waste management in school

- Placement of paper collection boxes;
- Battery collection?!
- Where there is a yard: composting;

Disposal

Municipal solid waste collection rate: 85%, of which:

- 3% recycling;
 - 8% incineration;
 - 89% landfill;
-
- 15% illegal dumping.



Incineration

- Municipal waste incineration: Rákospalota;
- Hazardous waste incinerators approx. 50: Dorog, Győr, Tiszaújváros, Balatonfűzfő, etc. + hospital incinerators;
- **Problems:**
 - the waste is not lost, only transformed (smoke, slag);
 - Flue gas: SO_2 , NO_x – acid rain; CO_2 – global warming;
 - ... demonstrates the mindset of disposable products ...;
 - applicability: otherwise unusable, contaminated with high-calorie waste, with adequate technical background, so as not to compromise with the material recycling;

Landfill

- Almost every village has a landfill;
- one-third of the landfills is not appropriate;
- construction of new landfills is a concern;
- regional landfills : ISPA;
- hazardous waste disposal : Aszód;

The use of agricultural and food waste (1)

□ Industrial use

- ✓ poultry feathers – amino acid;
- ✓ poultry manure – uric acid;
- ✓ bone – glue;
- ✓ blood – albumin and plastics;
- ✓ cocoa bean shell – theobromine;
- ✓ industrial alcohol diluted swill – potash;
- ✓ spirits industry molasses slop – betaine;
- ✓ wine grape industry, marc – tanning substances;
- ✓ lees – tartaric acid;
- ✓ sunflower husks and rice husks – furfural;
- ✓ sunflower plate – pectin;
- ✓ tobacco industry – nicotine;
- ✓ straw – cellulose;
- ✓ wood and cellulose – ethanol;

The use of agricultural and food waste (2)

□ Agricultural use

Foraging

- ✓ corn stalk grazing with beef cattle;
- ✓ corn stover ensilage, preparation for consuming at dairy farms;
- ✓ cereal straw exploration;
- ✓ Feeding of fresh and ensilaged sugar beet at dairy farms;
- ✓ feeding of sunflower plate with ruminants;
- ✓ dry peas;
- ✓ vegetable and fruit waste;
- ✓ raw sugar beet from sugar factory;
- ✓ raw marc from brewery;
- ✓ spirits industrial swill (vinsasse);
- ✓ skim milk, buttermilk, whey;
- ✓ meat meal, fish meal, oil cake;
- ✓ meat pulp feeding with pigs;
- ✓ exploring horn chemical by-products as an additive for rabbit, poultry and pig fattening farms;

The use of agricultural and food waste (3)

□ Agricultural use

Manuring

- ✓ aged, litter manure, slurry;
- ✓ chopped straw, corn stover and slurry mixture;
- ✓ cereal straw and corn stalk chopped and turning in addition fertilizer;
- ✓ cane and chips, co-composting of pork and poultry manure mixture;
- ✓ fertilization with wastewater and sludge;

Soil drainage

- ✓ organic materials – humification;
- ✓ improving pH-conditions – beet potash;
- ✓ saline – gypsum slurry;
- ✓ reclamation;

The use of agricultural and food waste (4)

□ Energy utilizations (1)

Pyrolysis

- ✓ Agricultural products of 14-21 MJ/kg energy, with high cellulose content (wood waste, rice husks, refuse grain, straw, manure straw, nuts and peanut shells, sawdust, husks, etc.);
- ✓ thermochemical processes in closed spaces, at high temperature;
- ✓ wood gas: 85% efficiency, 5000-7500 kJ/m³ energy;
- ✓ 1 ton of air-dried wheat straw, 500-600°C = 300 kg of coal, 38 litre of tar oil, 280 m³ of gas, 15000 kJ/m³ calorific value;
- ✓ primarily commercial and municipal use;
- ✓ moderate capital requirements moderate capital requirements;

The use of agricultural and food waste (5)

□ Energy utilizations (2)

Biogas recovery (1)

- ✓ a relatively small investment;
- ✓ it can be used in agriculture;
- ✓ low level of elaboration;
- ✓ all **natural organic material** is suitable for this purpose;
- ✓ **oxygen closed environment**;
- ✓ **methane bacteria**;
- ✓ for intensive production: constant and balanced temperature, continuous mixing, chopping, appropriate ratio of **methanogenic and acidogenic bacteria strains** (symbiosis) is required;
- ✓ from 1 kg of dry material 250 - 900 litre gas is produced;
- ✓ acidic phase: degradation to simple compounds;
- ✓ methanogenic phase: 60% methane, 40% CO₂ and H, N, S are generated;
- ✓ Anaerobic digestion - hygienisation;
- ✓ energy content: 22600 kJ/kg;

The use of agricultural and food waste (6)

□ Energy utilizations (3)

Biogas recovery (2)

- ✓ 50% of starting material is converted, while the remaining is liquid or solid compost;
- ✓ biogas obtained from a daily manure of a livestock is equivalent to 0.8 kg of fuel oil. One cattle produces 6,4 kg, while one pig 0.51 kg of manure per day;
- ✓ after secession of 65-70% of starting material, the rot is stopped (yeast production from corn - to cover the heat demand);
- ✓ biogas can be used in all gas-powered machines and equipments;
- ✓ compression (in vehicle engines) is uneconomic;
- ✓ main guidelines for development: an expense-reduction and long-term development of efficient operation;
- ✓ economical use of end products;

The use of agricultural and food waste (7)

Energy utilizations (4)

Incineration

Agricultural and wood waste burning

- ✓ reproduced every year;
- ✓ CO₂ emission and immission is the same rate;
- ✓ ash is free from sulphur and improves the soil;
- ✓ corn stalk cannot be used (when chopped and destined and then managed by micro-organisms, it becomes humus by spring), their combined cost is less than the fertilization;
- ✓ fruit tree trimmings, dried shit of grape, straw: direct combustion;
- ✓ bio-briquette: **12% manufacturing cost for the straw**, there is no S content, ash is environmentally friendly;
- ✓ sunflower stalk: when dehydrated, it is good fuel but harvesting and storage is not solved;

The use of agricultural and food waste (8)

Energy utilizations (5)

Burning

Agricultural and wood waste burning

Logging

- ✓ A significant part of the waste would be processed in 8-10% of energy investment;

Primary wood processing

- ✓ sawdust, bark – high humidity;
- ✓ investing **6-8%** of the calorific value of the bio-briquette; **reason:** public use - internal use - no harvesting and transportation expenses;

Secondary wood processing

- ✓ veneer, particle board, furniture, flooring, etc. - air-dry waste;
- ✓ piece of waste: household use;
- ✓ sanding dust – bio-briquette (non-exportable due to the adhesive or laminating material powder);
- ✓ overall, 60% of the waste is used;
- ✓ 250 000-300 000 tons/year could be even useful, this 90 000 tons of oil equivalent;

LANDSCAPE SURGERY

CAMPAIGN FOR ELIMINATING ILLEGAL WASTE DUMPS

- 1. Mapping of illegal waste dumps;**
- 2. Awareness raising, planning,
organization;**
- 3. Elimination of illegal waste dumps;**
- 4. Preservation of order;**



Always look on the bright side
of things!

We finished for today, goodbye!

ямарваа нэг зүйлийн гэгээлэг
талыг нь үргэлж олж харцгаая
өнөөдөртөө ингээд дуусгацгаая, баяртай

让我们总是从光明的一面来看待事物吧！

今天的课程到此结束，谢谢！

دعونا ننظر دائما إلى الجانب المشرق من
الأشياء!

انتهينا لهذا اليوم، وداعا!