



KESKKONNAAMET



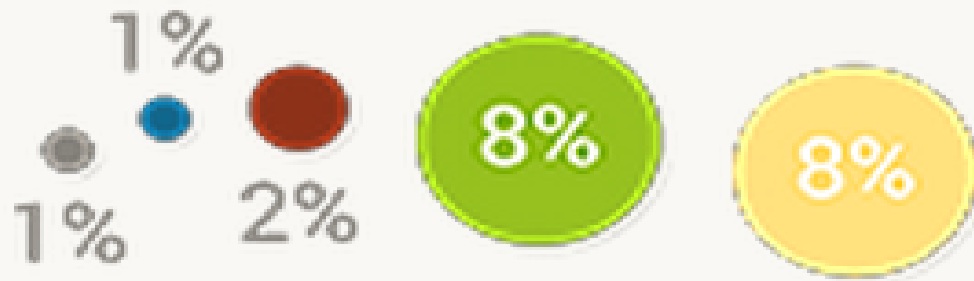
Waste management in Estonia

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Estonian Environmental Board
Deputy Director

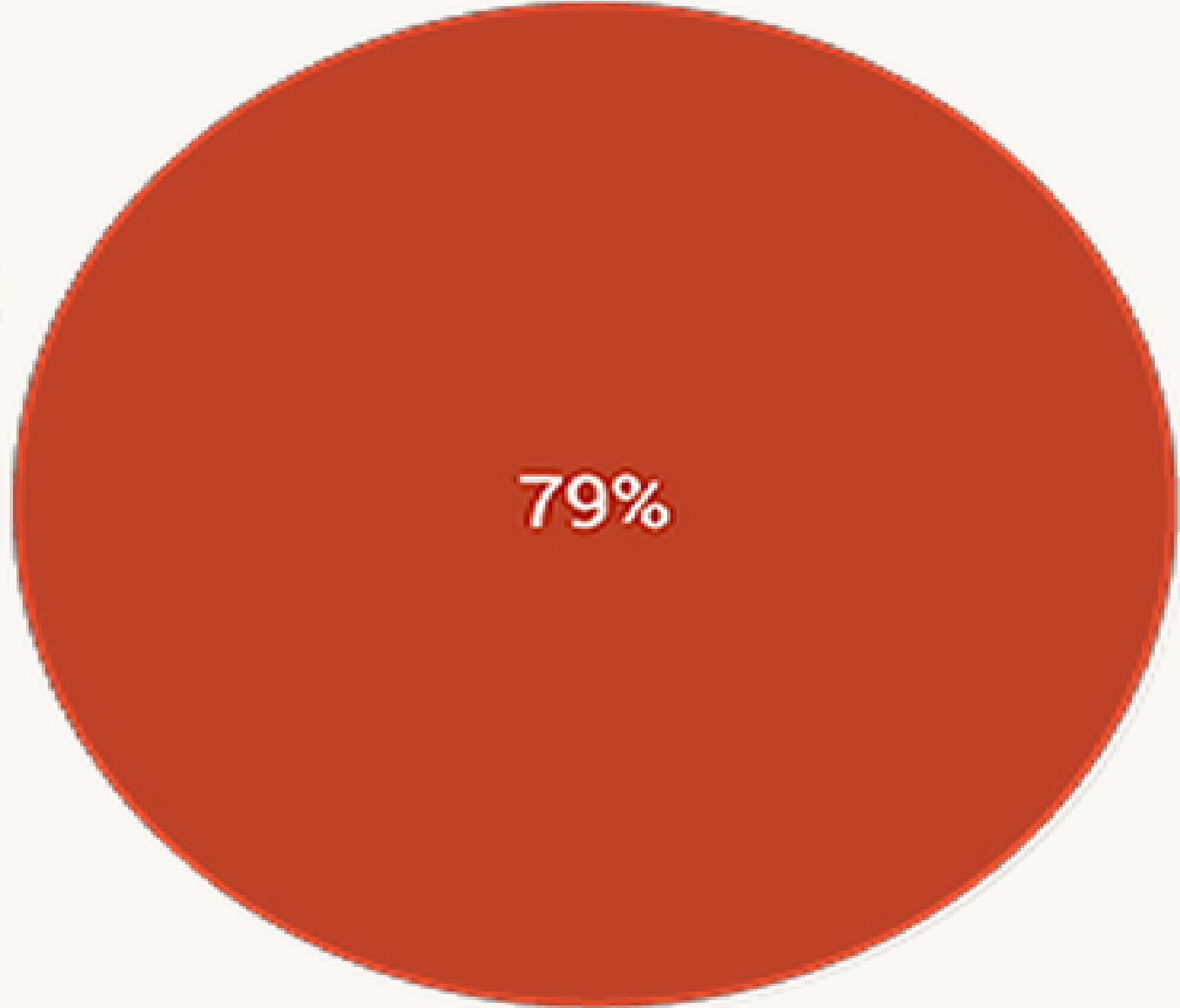




What about Estonia: <https://youtu.be/AxwxPnbXf7I>



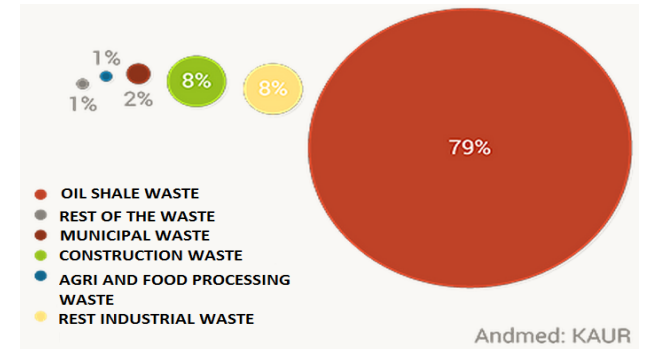
- OIL SHALE WASTE
- REST OF THE WASTE
- MUNICIPAL WASTE
- CONSTRUCTION WASTE
- AGRI AND FOOD PROCESSING WASTE
- REST INDUSTRIAL WASTE



WASTE STREAM DISTRIBUTION IN ESTONIA 2007...2011
 Andmed: KAUR

Estonia and waste (some facts)

- Estonia is 0,2% of EU population and 1% of EU territory,
- We have 215 municipalities (439 districts in Germany)
- 80% municipalities have less than 5000 inhabitants
- Estonia „produced“ **22 483 842** tons of waste in 2013:
 - 10 444 135 tons of hazardous mining and oil shale industry waste
 - 7 794 652 non-hazardous mining waste
 - 1 922 600 tons of construction and demolition waste
 - 770 289 wood industry waste
 - 376 733 (mix) municipal solid waste

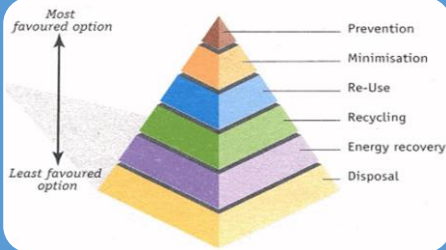


Municipal solid waste represents 1,7% of total waste quantity and 98,3% of public discussion about waste...



Background

- Where we came from?
- History of landfilling, drivers forward
- Current situation, perspective



The move forward

- Drivers, targets, thresholds
- Extended producers responsibility
- Deposit return system



Waste management planning

- Waste management scenarios
- Sorting and other principles
- Waste collection and organised waste transport



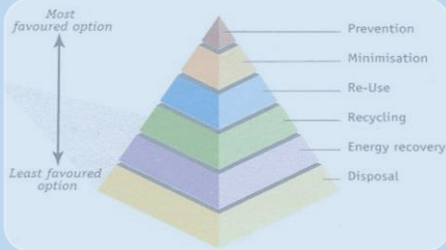
Economic instruments, financial issues

- Gate fees and cost recovery
- Landfill tax, pollution charges, packaging excise duty
- Financing municipal waste collection and treatment



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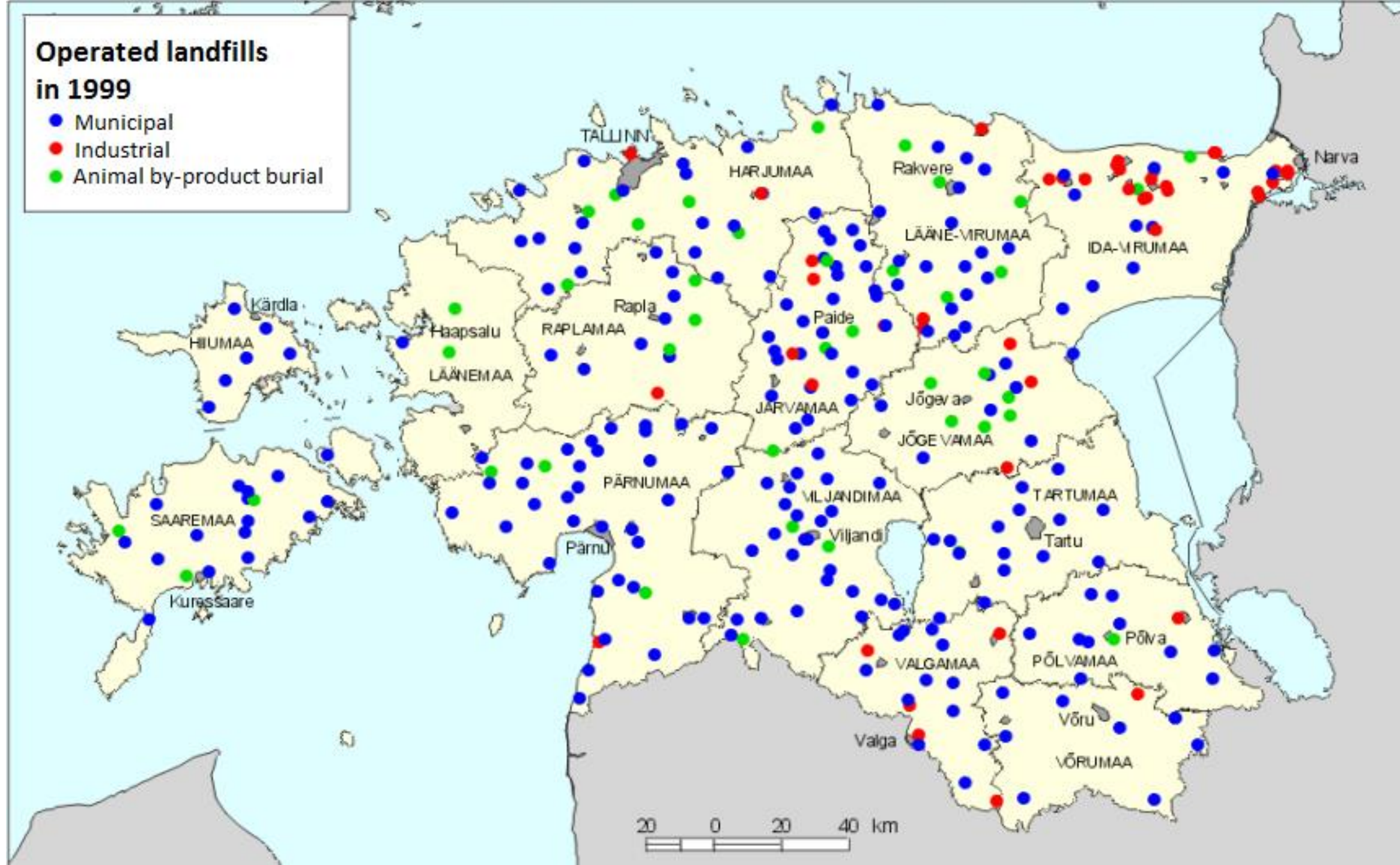


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Operated landfills in 1999

- Municipal
- Industrial
- Animal by-product burial



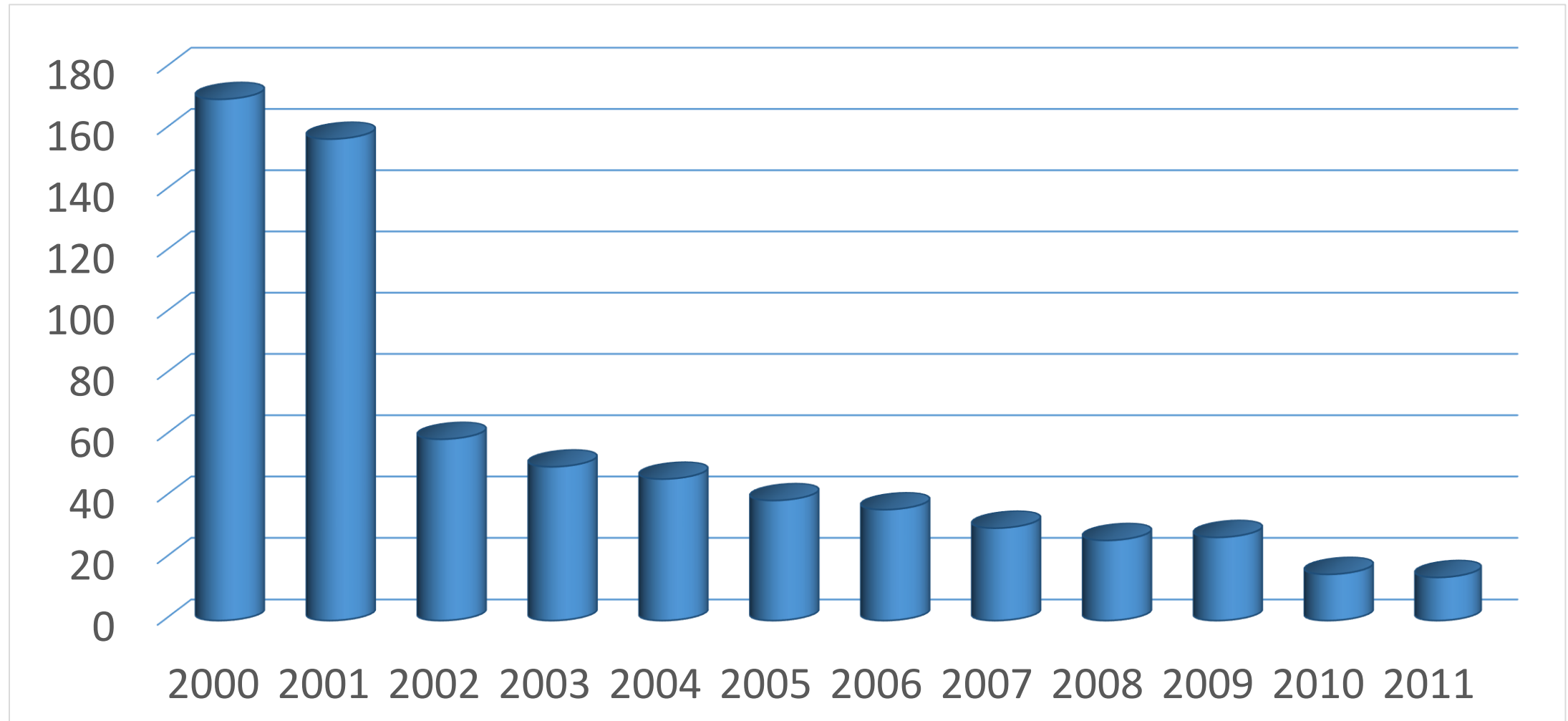








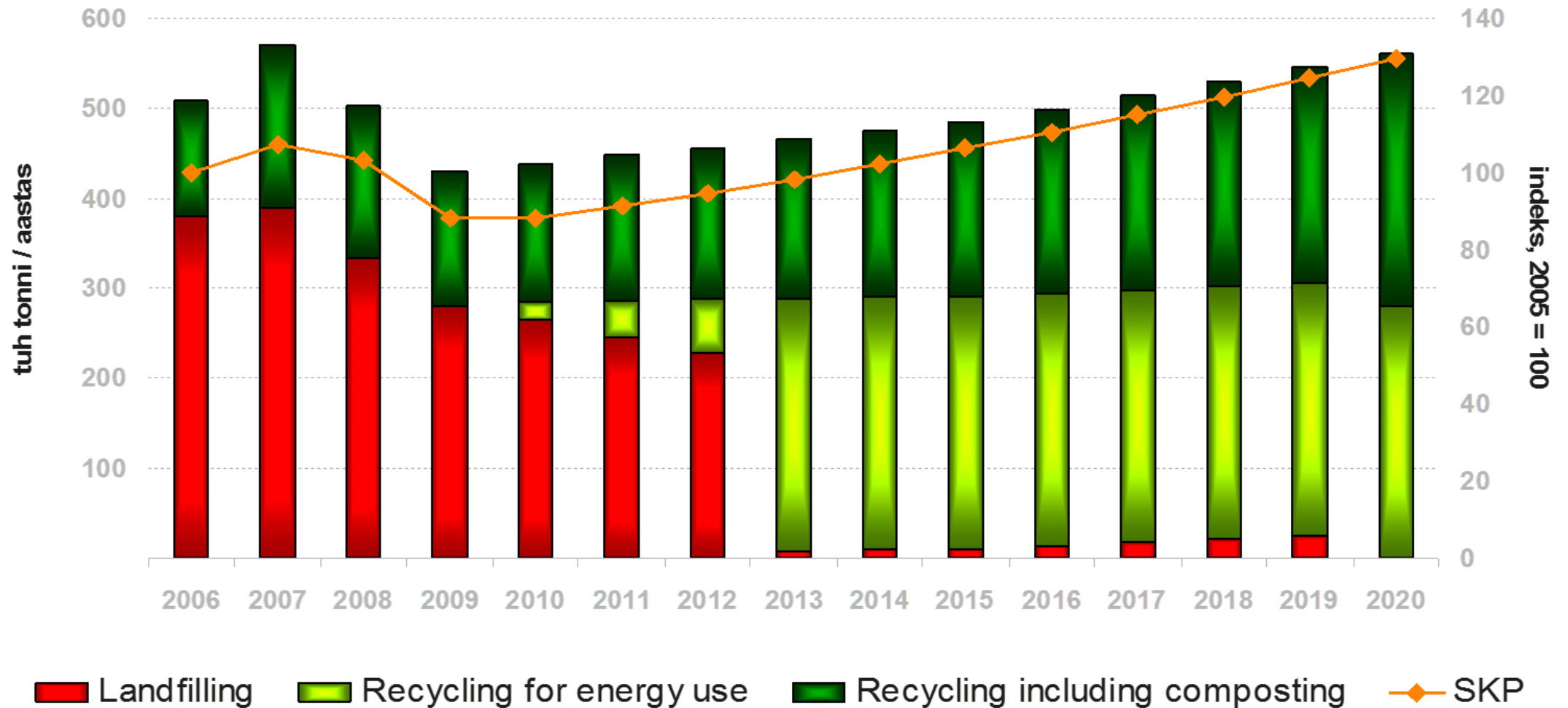
Number of landfills (Estonia 2000...2011)



**Non-hazardous waste
landfills 2010**



Waste management „evolution“ in Estonia...



Waste as a energy source

Oil shale

Energetic value **8-10 MJ/kg**



Biomass

Energetic value **7-10 MJ/kg**



Mixed municipal waste

Energetic value **8-14 MJ/kg**



The beginning of the period of incineration...



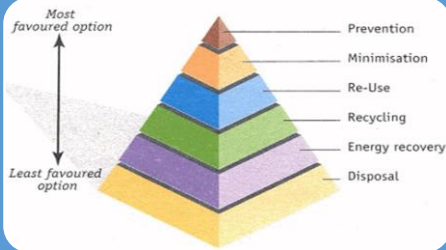
Thermal output 50 MW Electrical output 17 MW	
Fuel	220 000 t/y mix municipal waste
Electricity	136 GWh/y
Heat	330 GWh/y
Investment	105 mln eur
Effectiveness	~82%





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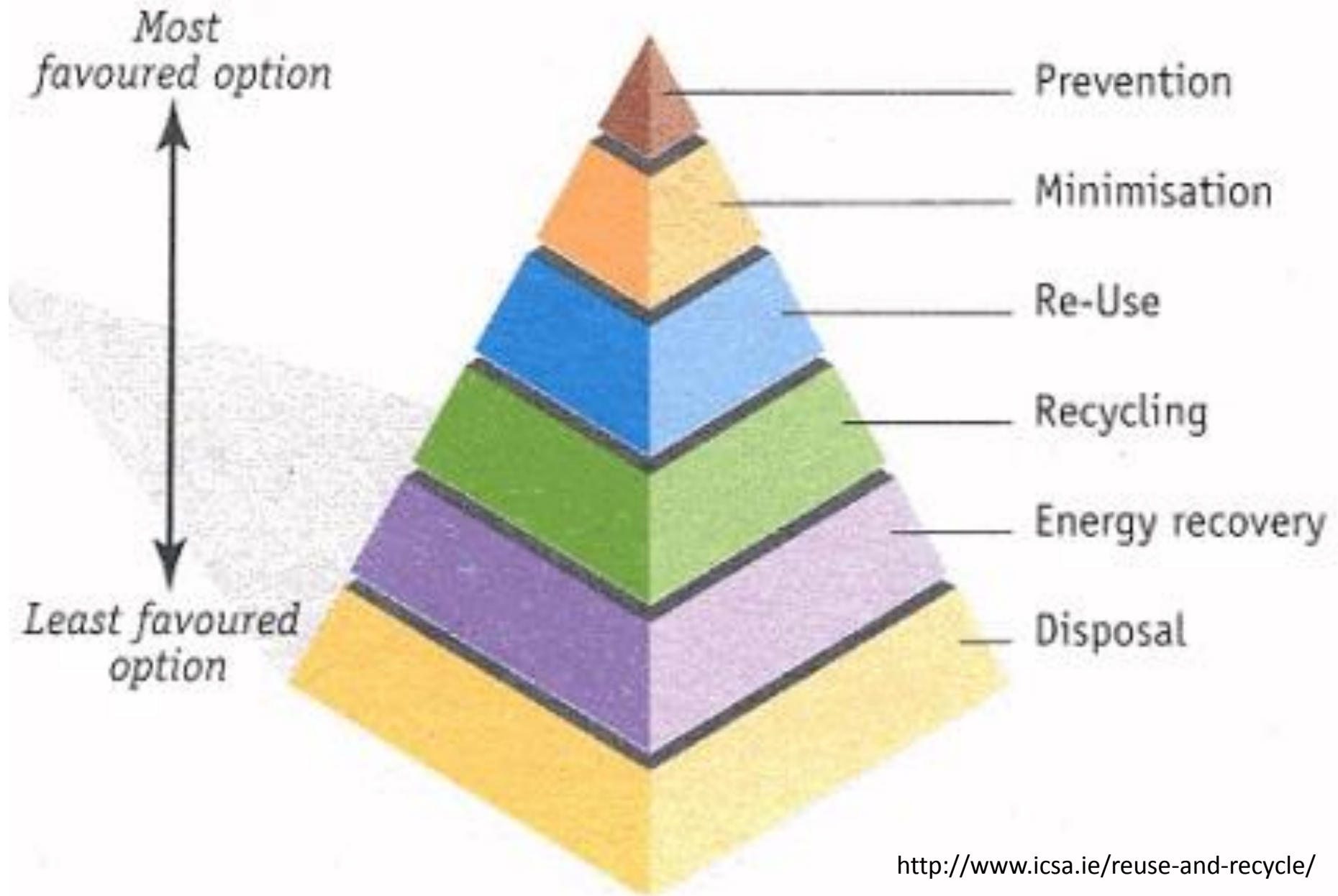
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Prevention of waste generation (main principles)

- In any activity, all appropriate measures shall be applied to avoid waste generation and care shall be taken to prevent the waste generated from causing any excessive hazard to health, property or the environment.
 - implement best available techniques;
 - design, plan, manufacture and import products which are reusable or with the longest possible life span and which after they are removed from use produce waste which is recoverable to the highest possible extent;
 - reduce the content of hazardous substances in materials and products.

Common challenges along the MSW Chain



- High growth rate of waste generated
- Lack of policies to reduce waste generation

- Low collection rate in low income communities
- Inefficient collection equipment
- Inefficient routing

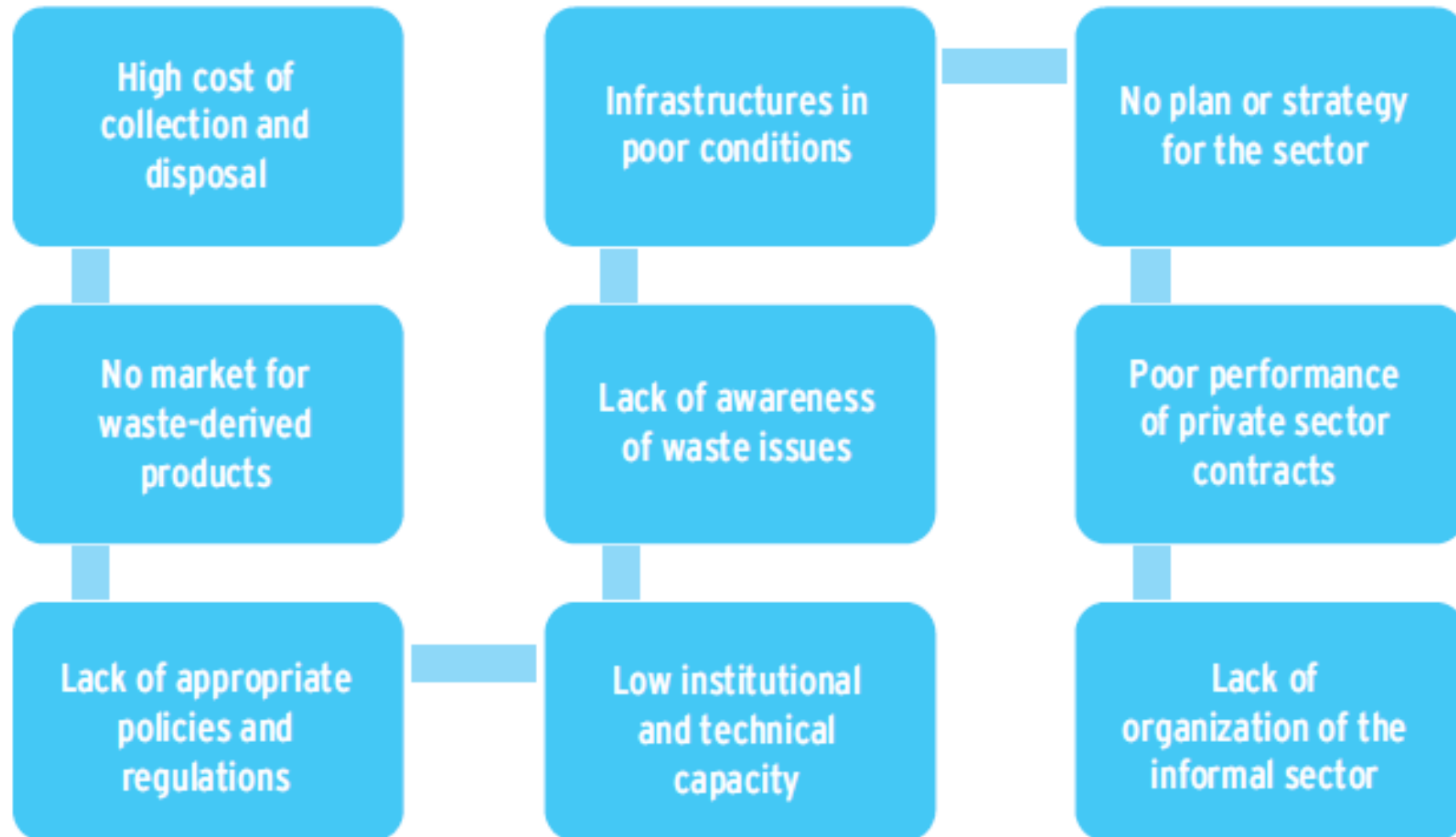
- Informal sector
- Lack of intergration of the informal sector
- Low rate of organic waste diversion

- Large use of insanitary dumpsites and open burning
- Land constraints for future sanitary landfills
- Severe environmental impact
- Lack of financial or technical capacity to operate sanitary landfills

- Untapped opportunity to generate energy from landfill gas
- Landfill gas to energy systems non-existent or in poor condition
- Local context unsuitable for waste-to-energy

Given by WorldBank

List of Challenges Undermining Proper Management of Solid Waste (WorldBank)



Packaging waste recovery targets (the drivers)

- From 1st January 2009 packaging waste shall be recovered:
 - ➔ **at least 60%** of the total mass
 - ➔ by way of recycling **at least 55%**
- Recovery obligation by packaging material type:
 - ➔ **70%** of the total mass of glass waste by way of recycling;
 - ➔ **70%** of the total mass of paper and paperboard waste, whereas **60%** of the total mass by way of recycling;
 - ➔ **60%** of the total mass of metal waste by way of recycling;
 - ➔ **55%** of the total mass of plastic waste, whereas 45 percent of the total mass of plastic waste by way of recycling and 22.5 percent of the total mass of plastic waste by way of reprocessing into plastic;
 - ➔ **45%** of the total mass of wood waste, whereas **20%** of the total mass by way of recycling.

Extended producers responsibility (EPR)

A strategy designed to promote the integration of environmental costs associated with goods throughout their life cycles into the market price of the products.



Extended producers responsibility (Estonia)

Applied to:

✓ Packages

✓ WEEE

✓ Batteries and accumulators

✓ Tires

✓ ELV

✓ Agricultural plastics



Extended producers responsibility (Recommendations)

Some recommendations:

- EPR organisations should be owned by the obligated companies and run on a not-for-profit basis
- There needs to be strong governmental support and monitoring
- There are many advantages of having one rather than multiple organisations in each country

Minimum requirements for EPR (EU Circular Economy Package 2014):

- ✓ ensure the transparency of the schemes in terms of contributions paid by the producers, including the impact on sale prices and in terms of the impact on competitiveness and the openness to small establishments and undertakings;
- ✓ define the geographical coverage of the schemes;
- ✓ ensure equal treatment for domestic producers and importers;
- ✓ ensure a self-control mechanism **via regular third party audits** of the schemes in terms of both:
- ✓ **sound financial management** of the scheme - calculation of the entire costs per type of products; use of the funds collected and;
- ✓ **appropriate collection and treatment of waste**, control over the legality of waste shipments and quality of data and reporting

Extended producers responsibility (PROs&CONs)

- + Costs are covered by producers, reduced need for public spending's- but the cost are added to the products, when put to the market
- + Free of charge take-back improves collection
- PROs sometimes non-transparent, ie controlled by very small group of producers → the proper use of recovery fees remains unclear
 - The legal requirements for wide and representative PRO-s is crucial!
- Some companies hide from the obligations (free riders) – to participate in collective schemes, reporting, recovery obligations etc
 - The EPR sets high requirements for supervision, registering and reporting solutions

Deposit-return system (General facts related)

General facts related:

- **Environmental view** – deposit systems can collect between 80-95%, container systems 40-60% as average
- **Quality view** – material coming from deposit systems are of highest value and therefore guarantee near 100% recycling of collected material
- **Consumer view** – gives clear message and motivation to consumers, even non- environmental consumers contribute
- **Social view** – significant non-formal or “after collection”, income for less fortunate people
- **Economical view** – if set up correctly, can be cheaper than container system

Deposit return system (Investments)

- Initial Starting investments – ca **4 M€** (counting Centre etc)
- ca 550 RVM-s so far (Reverse Vending Machines) – by Retailers ca **8 M€** - covered with 'take back compensation' – no state support
- New counting and material treatment center opened on 2013 – **6 M€**, from that 50 % EU Funds

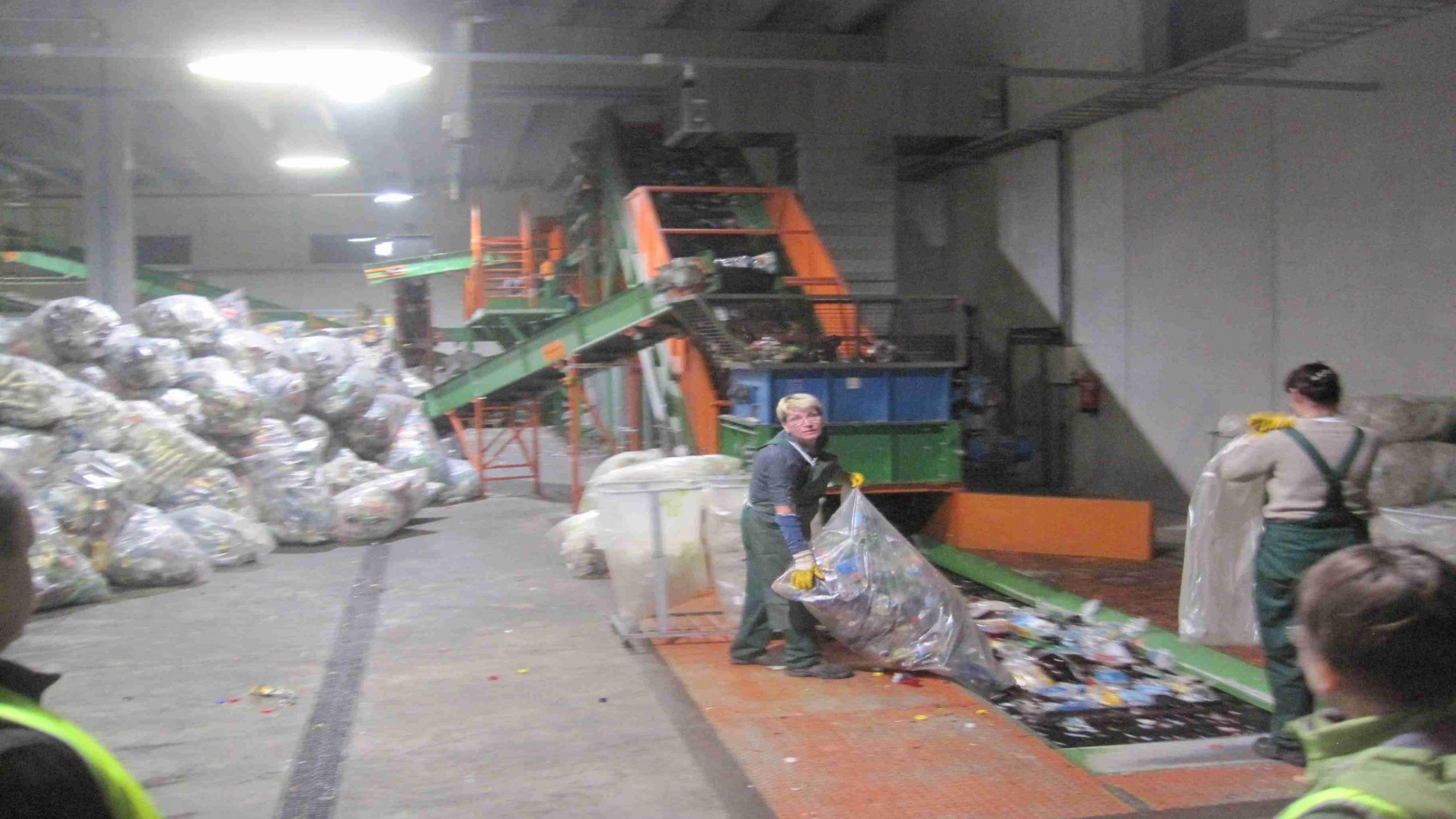


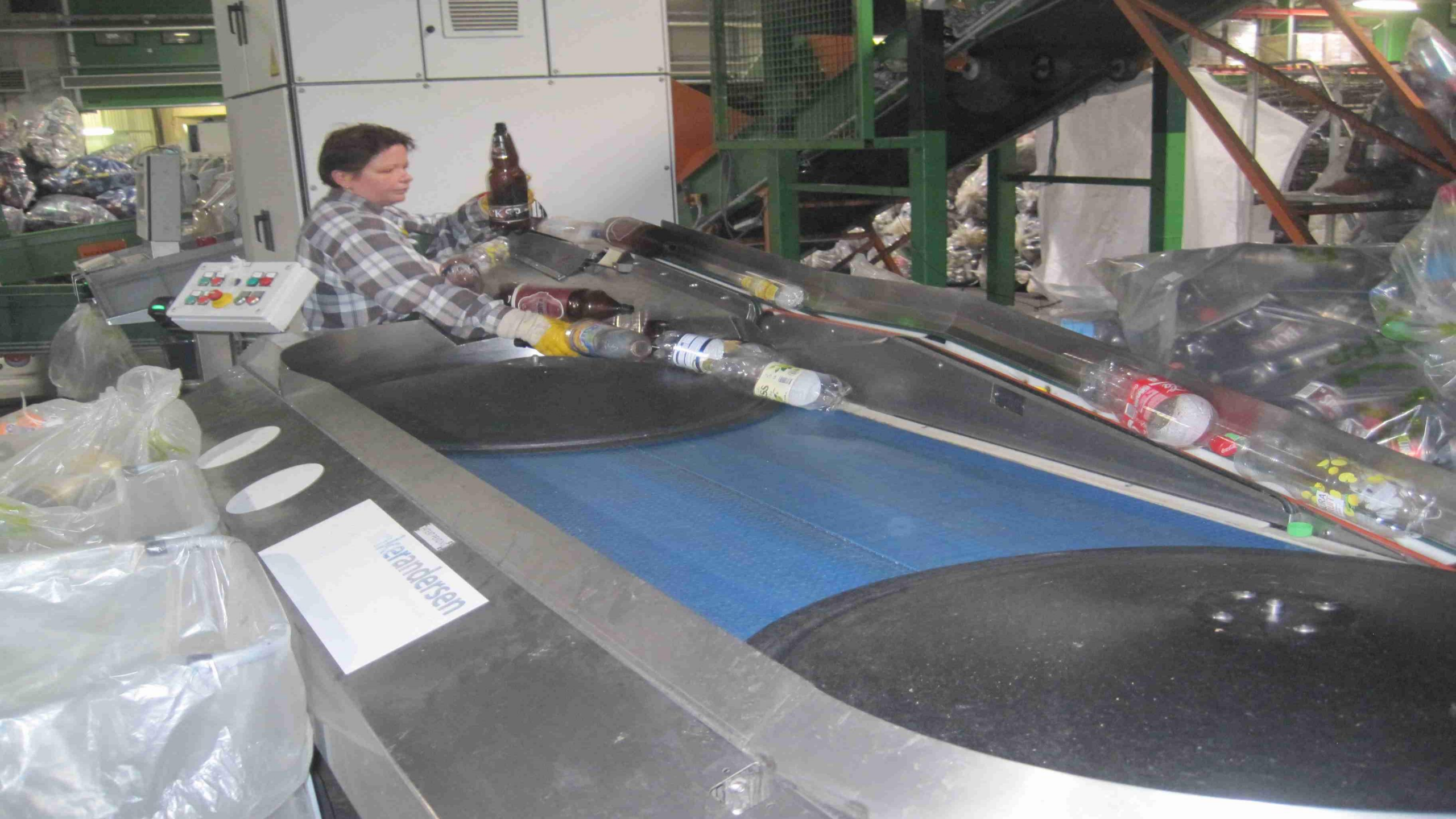
KLAASPAKEND

The deposit scheme operated in Estonia is financed mainly by:

- 1) fees paid by producers (fillers and importers)
- 2) unredeemed deposits and
- 3) income received from the sales of collected materials







Kerandersen





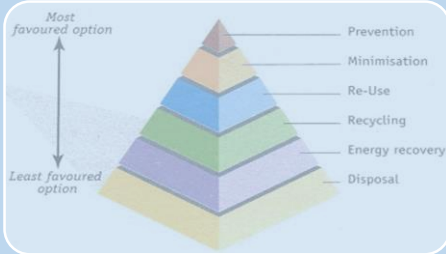
Deposit-return system (PROs&CONs)

- +very effective, collection rates **80-90%**
- +very clean material, suitable for high quality recycling
- +**visibly reduces littering in public places**
 - +Producers fees have changed in time, and on certain period been on €/kg bases even higher, then in container collection, but currently are remarkably cheaper (**0 – for all packages since 2014 !**) due to the efficiency of work, higher material prices and unredeemed deposit
- retailers disliked the take back obligation in shops at the starting phase
- strong economic motivations could motivate also fraud



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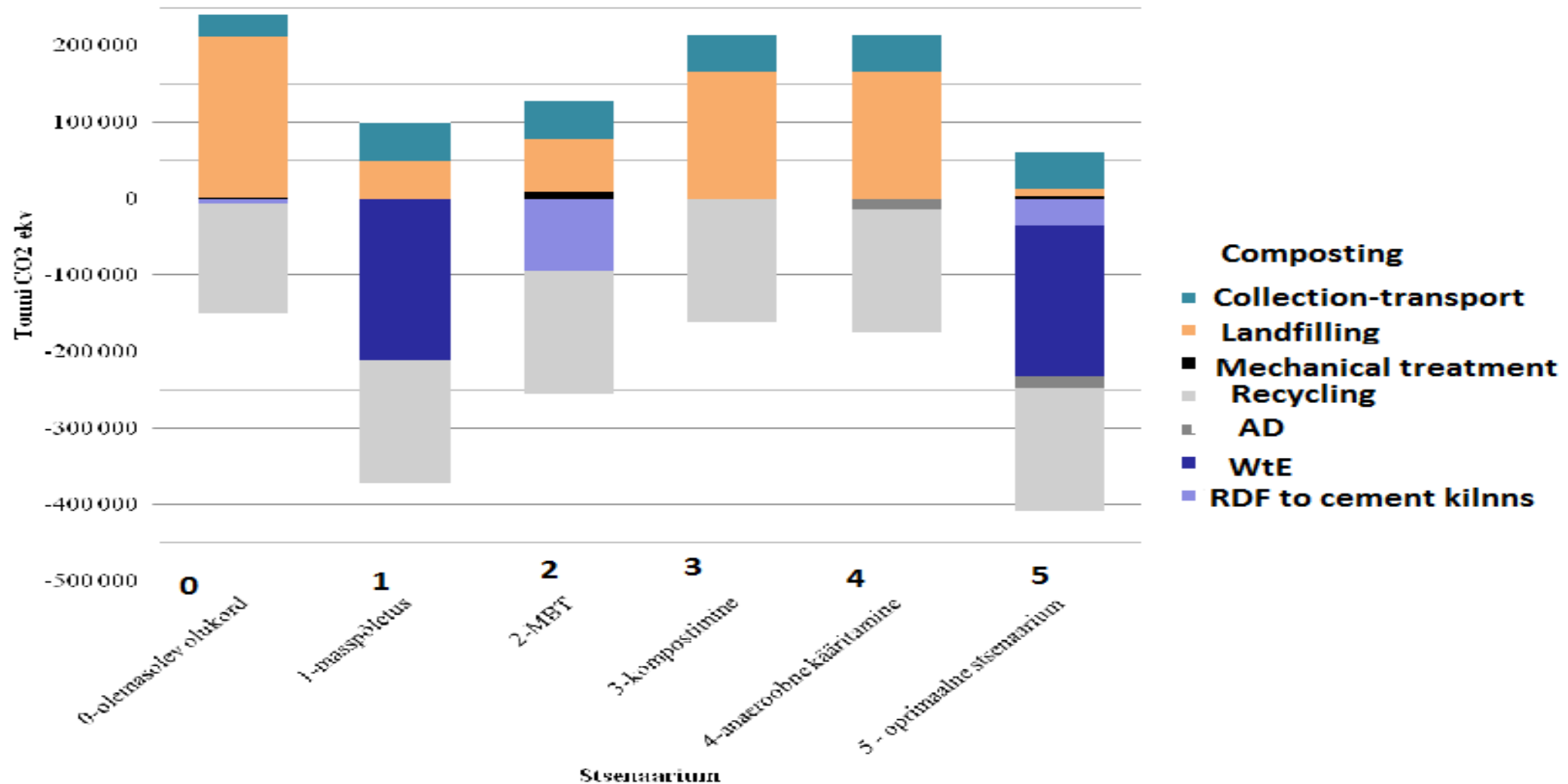
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Waste management scenarios

Basic prognose of the Total Generation of MSW on 2020 - 540 th t/y

1. **Mass-incineration** – mixed residual waste (until 220 th t) is delivered to WtE facility, exceeding capacity is landfilled
2. **MBT** – equal amount of the mixed residual waste is delivered to the MBT (ca 50 % of the RDF is produced)
3. **Composting** – source separated bio-waste is composted using different technical solutions
4. **Anaerobic treatment** – all bio-waste, suitable for AD treatment is delivered to AD, rest to the composting
5. **Optimal** – the scenario with the **lowest environmental impact**

Environmental impact as CO₂ emissions



Waste management planning at a local level

- Local Government Waste Management Plan
 - **Public procedure** – display and discussion
 - Everyone has the right to submit proposals and objection
- Local government waste handling rules
 - Shall be established by a regulation of the local government council
 - Shall set out organisation of waste handling and storage and the relevant technical requirements, such as the type, material and size of collection containers, the bottom structure and location of the containers, the use of shared collection containers, etc.

Requirements for sorting

- Following waste streams are subject to separate collection:
 - paper and cardboard; plastic; metals; glass; bio- and non-biodegradable kitchen/food and garden/park waste; packages; wood; textile; bulky waste; wastes covered with producers responsibility principle; hazardous waste
- ➔ **The Municipalities are obliged to regulate and ensure the collection of most waste types**
- ➔ **For the separate collection the collection at source is necessary, but for several waste items also Waste stations are crucial!**

Municipal waste collection by three layer system

Collections on the site of generation

- responsibility of the waste owner: typically containers, on some cases plastic bags etc- mixed municipal waste, optionally source separated paper and cardboard, kitchen- and garden waste

Bring-points

- ca 500 m in towns, until some km in rural areas – packages, in some places paper and cardboard, clothes. Packaging containers may be responsibility of packaging organizations

Waste stations/ recycling yards

- in towns ca 1-4 km: In country side 10-15 km: Bulky waste (furniture, C&D waste, WEEE tires, garden waste, metals, paper, packaging, HazW from households etc.



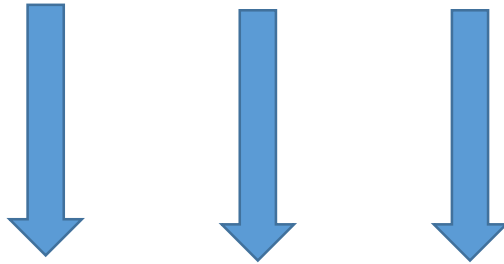
Organised waste transport (Estonia)

Collection and transport of municipal waste from a designated area to a specific waste management facility or facilities by an undertaking chosen by way of a competition organised by the local government.

- **SHALL BE** - the collection and transport of municipal waste, primarily garbage or mixed municipal waste, their sorting residues and the types of waste resulting from separate collection of waste at the site of generation of municipal waste
- **MAY BE** - other waste if this is necessary for the performance of the requirements or if this is necessary due to a significant public interest.

Subscription to organised waste transport services

- The waste holder is deemed to have subscribed to the organised waste transport services as of the entry into force of the waste permit for organised waste transport issued by the local government or of a local waste ordinance



In principle NO ONE can stay outside the collection system



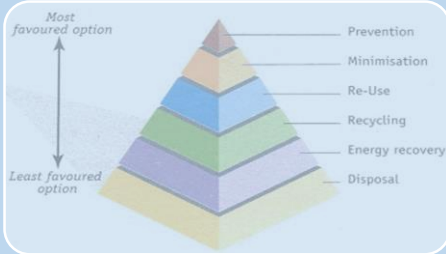






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Economic instruments

There appears to be some general consensus in the definition of an economic instrument as...

a policy, tool or action which has the purpose of affecting the behaviour of economic agents by changing their financial incentives in order to improve the cost-effectiveness of environmental and natural resource management.

The cost and fees

- Waste transport fees shall cover the costs of establishment, operation, closure and aftercare of waste treatment facilities and the costs of waste transport and the costs related to preparation of transport.

POLLUTER HAS TO PAY

- The amount of a waste transport fee shall be determined on the basis of the type, quantity and properties of waste, the frequency of waste transport services, and other circumstances which have a significant impact on the cost of waste handling.



Economic instruments



REVENUE RAISING

- Waste holder charges (PAYT);
- Product charges (to handle problem products);
- Disposal taxes;
- Resource taxes

REVENUE PROVIDING

- Charge reduction (based on proof of recycling);
- Host community compensation

NON-REVENUE

- Deposit-refund systems;
- Take back systems;
- Procurement preferences (favour products with recycled content)

Gate fees of some type of treatment (Estonian case)

	LANDFILL	INCINERATION	COMPOSTING	MBT
GATE FEE (per ton)	75€	35€* - 45€	40€	35€
ENV. CHARGE	30 €	For air emmissions		
FUNDING OF ESTABLISHMENT	HIGHLY STATE SUPPORTED	NO SUPPORT, BUT „green energy and co-generation“ SUBSIDIES*		
REMARKS			COMPOST SOLD FOR 5€/t	

Transport cost optimisation

If mixed municipal waste transport distance to treatment facility **> 50 km**

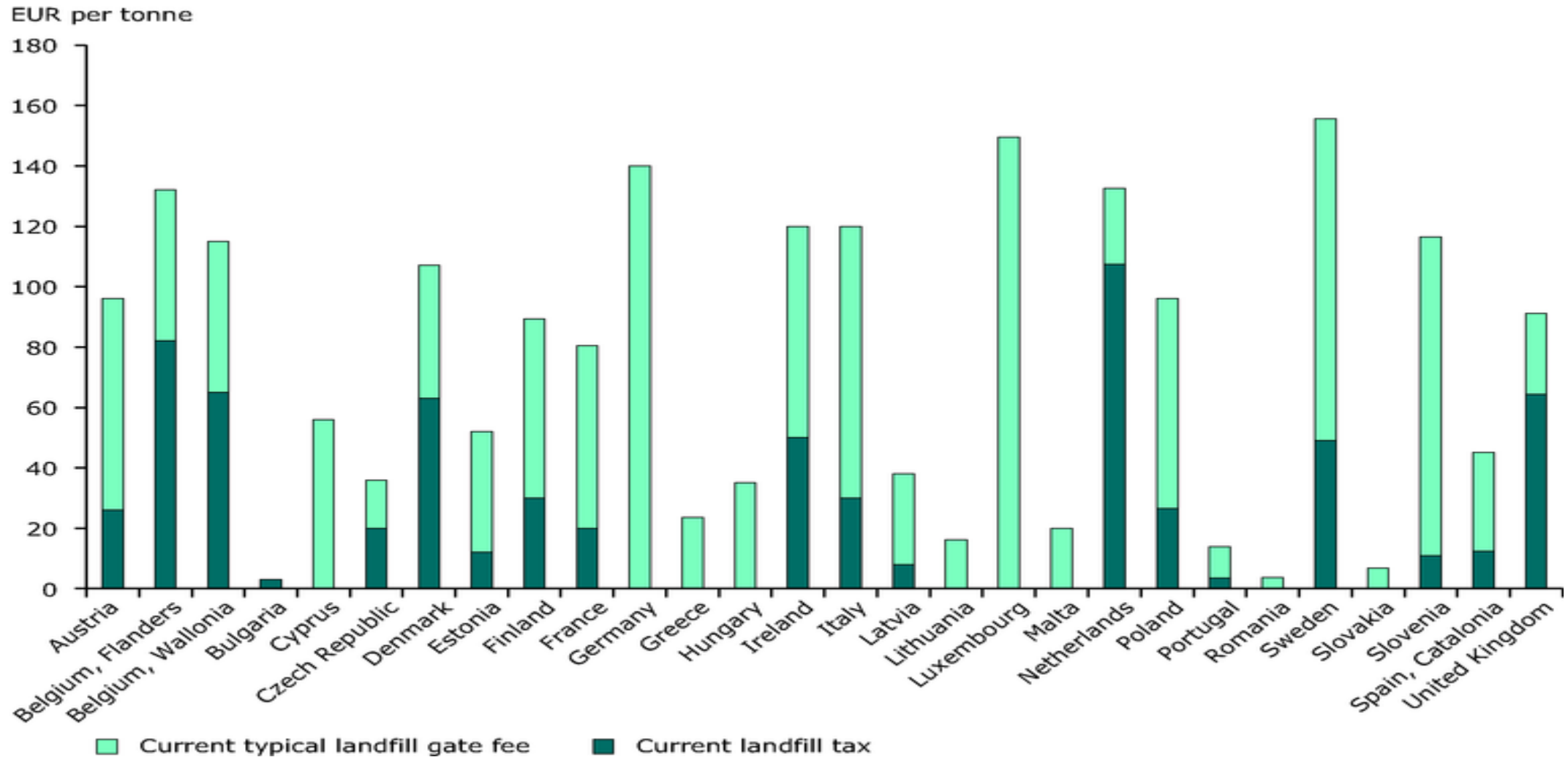


- Usual collection truck takes a load **6-7 t**, average costs of transport **1 €/km**,
 - For 100 km trip = **28,5 €/t**
- Special pressed containers (truck+trailer), up to **38 t** is allowed.
 - For 100 km trip = **5,2 €/t**



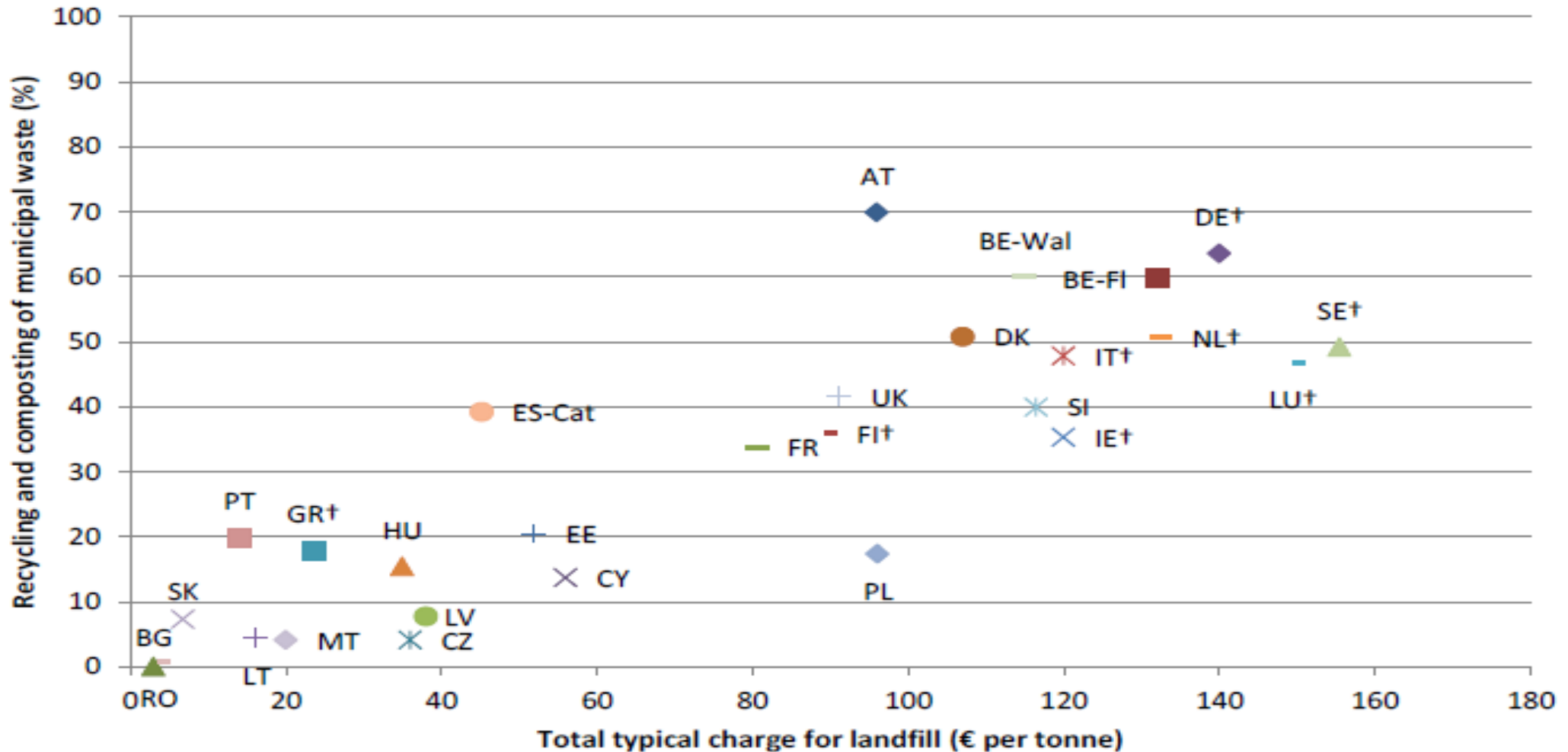
Typical charges for legal landfilling, 2013

(<http://www.eea.europa.eu/>)



Landfill gate fee vs recycling

(based on 2009; Bio Intelligence Services, 2012)



Financing of municipal waste collection and treatment

FLAT FEE MODEL

All households pay exactly the same sum, generally to the Municipality (is not widely used in Estonia)

PAYT MODEL

Pay as you throw common options:

- Fee, **based exactly on measured amount** of service - per exact weight or volume delivered (*Full-unit pricing*)
- **Certain amount is included** in 'basic fee', what goes above, is charged additionally (*Partial-unit pricing*)
- The fees are based on **different service packages**, there is option to choose and change those packages (*Variable-rate pricing*)

Financing of municipal waste collection and treatment

FLAT FEE MODEL

- + demotivates littering and 'fly-dipping and home incineration
- demotivates also sorting and waste reduction

PAYT MODEL

- + motivates sorting for recovery, and waste reduction
- motivates also fly-dipping and home incineration

If there is a question of „finding, locating, involving“ the waste holders...

1. FLAT FREE MODEL



2. PAYT MODEL

Conclusions (financial issues)

- ➔ Costs recovery of the municipal waste management is possible, but needs step by step approach
- ➔ The Basic treatment facilities should be considered as 'normal companies' and their service fees be set accordingly
- ➔ Transparency!!!
- ➔ Investments supports scheme should be targeted to the issues which will have positive impact to the future – more for recycling, less for disposal

Conclusions (overall)

- ➔ Improving one activity along the solid waste value chain does not always result in a transformational change in the solid waste system.
 - ➔ Solid waste management is a chain, and all parts of the chain must be in a good working condition for meaningful improvement of the service.
- ➔ Incentivizing collection and disposal without any provision for recycling may not lead to long-term financial and environmental sustainability.
 - ➔ A large proportion of solid waste is organic and recyclable waste, which can be used beneficially instead of disposed into landfills.

Conclusions (overall)

- ➔ Proper legislations in place, clear requirements and sanctions
- ➔ Right Economic incentives and measures, to promote recycling
- ➔ Proper support schemes for new Infrastructure
- ➔ Active awareness campaigns and Environmental Education on all levels
- ➔ Adequate Control and Enforcement capacity, well trained and motivated staff

The Importance of investments support is often over-estimated
Infrastructure is important, but if other factors do not support the whole
process, it does not help much...

Feedback, questions and further cooperation

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