

# **Economic Instruments in the Waste Management Sector**

Experiences from OECD and Latin  
American Countries

## **Summary**

## Economic Instruments

**All levies, permit trading schemes, and subsidies that create incentives and disincentives mobilizing the self-interest of consumers, producers, and service providers to make environmental improvements or reduce adverse environmental consequences.**

Revenue-generating instruments	Revenue-providing instruments	Non-revenue instruments
e.g. charges, fees and taxes	e.g. direct subsidies, tax exemptions, etc.	e.g. permit-trading schemes, deposit-refund systems, etc.

## **Economic Instruments Surveyed for this Study**

- **Municipal Waste Charges**
- **Landfill Taxes**
- **Landfill Allowances Trading Scheme**
- **Deposit-refund Systems**
- **Advanced Recycling Fees**

## Analytical Categories Applied to All Instruments

- **Environmental effects**

To what extent are incentives created by the instrument capable of effectively contributing to the respective environmental objective?

- **Revenue generation**

What is the revenue potential of the instrument? To what extent are revenues reliable and stable?

- **Market effects**

In which way does the implementation of the respective instrument influence competitiveness of specific sectors? What measures have been taken to compensate for these effects?

## Analytical Categories Applied to All Instruments

- **Social effects**  
In which way does the implementation of the instrument have an influence on income distribution?
- **Administrative costs**  
What are the administrative costs caused by the implementation of the instrument (e.g. tax and data collection, monitoring, etc.)
- **Political acceptance**  
Has there been any significant political or social opposition against the implementation of the instrument?

## Indicators used for the short evaluation of the instruments in each analytical categories

	<b>Environ. Effects</b>	<b>Revenue generation</b>	<b>Market effects</b>	<b>Social Effects</b>	<b>Admin. Costs</b>	<b>Political Acceptance</b>
<b>--</b>	<b>Strong negative effects</b>	<b>Very weak/unstable revenue generation</b>	<b>Very negative competitiveness effects</b>	<b>Very negative social effects</b>	<b>Very high administrative costs</b>	<b>Very low political acceptance</b>
<b>-</b>	<b>Negative effects</b>	<b>Weak/unstable revenue generation</b>	<b>Negative competitiveness effects</b>	<b>Negative social effects</b>	<b>High administrative costs</b>	<b>Low political acceptance</b>
<b>0</b>	<b>No effect</b>	<b>Neutral</b>	<b>No competitiveness effects</b>	<b>No social effects</b>	<b>Regular administrative costs</b>	<b>Neutral</b>
<b>+</b>	<b>Positive effect</b>	<b>Strong/stable revenue generation</b>	<b>Positive competitiveness effects</b>	<b>Positive social effects</b>	<b>Low administrative costs</b>	<b>High political acceptance</b>
<b>++</b>	<b>Strong positive effect</b>	<b>Very strong/stable revenue generation</b>	<b>Very positive competitiveness effects</b>	<b>Very positive social effects</b>	<b>Very low administrative costs</b>	<b>Very high political acceptance</b>

## Municipal Waste Charges

- **Flat-rate user charges**, which are paid specifically to cover the costs of waste management services, but where all users pay the same amount independent of the quantity or quality of waste;
- **Service-unrelated variable-rate user charges**, where the individual rates for users vary but with the nature of the variation being unrelated or only indirectly related to the quantity or quality of waste generated (such as property tax, water or energy consumption, income tax, number of dwellers); and
- **Service-related variable-rate user charges (unit-pricing)**, which vary with the amount or quality of waste generated, thus creating an environmental incentive for waste reduction and better separation. These types of charges are also often referred to as “direct charging” or “pay-as-you-throw” systems.

## Municipal Waste Charges

	Flat-rate charges	Unrelated variable-rate charges	Service-related charges
<b>Assessment Unit</b>	- per household	- size of building or estate - household income - number of people living in a household	- volume of waste collected - weight of waste collected

## Municipal Waste Charges

	Flat-rate Charges	Service-unrelated Variable Charges	Unit-pricing Models		
			Variable Size Container Subscription	Pre-paid bag systems	Proportional Weighing or Measuring Systems
<b>Environmental Effects</b>	0	0	+	++	++
<b>Revenue (Stability)</b>	+	++	-*	-*	--*
<b>Market effects</b>					
<b>Social Effects</b>	-	++*	-	-	-
<b>Administrative Costs</b>	++	+	+	-	-
<b>Political Acceptance</b>	+	+	++	++	++
<p>* Revenue volatility of unit-pricing models may be significantly reduced by implementing hybrid forms of charging, where a fixed basic fee and a variable service fee are combined.</p> <p>**Very positive social effects IF charges are varying on the basis on income or a proxy thereof.</p>					

## Municipal Waste Charges

### **Environmental Effects** (reduction of waste generation and improved separation)

- Unit-pricing models create incentives for waste reduction and improved waste separation.
- Unit-pricing models can be based on container size, number of bags collected or weight-based.
- Effectiveness of incentives is smallest for container-size models and largest for weight-based models.
- „Pay-per-bag“ systems also create effective incentives and are comparably easy to implement.

### **Revenue Effects**

- A central issue concerning revenue effects is revenue volatility.
- Flat-rate charges and variable-rate charges based on comparatively stable variables such as income or real estate value guarantee small revenue volatility
- For unit-pricing models, hybrid systems where the variable charge is combined with a flat basic charge are a possibility to minimize revenue volatility.

# Municipal Waste Charges

## Social Effects

- Municipal waste charges generally tend to be regressive.
- Adjusting rates to the actual costs of waste collection in a certain service area may aggravate the regressive effect because waste collection tends to be more expensive in poorer neighbourhoods.
- Regressive effects can be cushioned by offering reduced rates for poor households or introducing a „solidarity element“ where poor households pay less, and rich households pay more.

## Administrative Costs

- Unit-pricing models are generally associated with higher administrative costs
- Administrative costs generally increase with the accuracy of measurement (e.g. weight-based models)
- A good middle-way between administrative burden and effective economic incentives are „pay-per-bag“ systems.

# Municipal Waste Charges

## Political Acceptance

- Waste charges of all types have a potentially high political acceptance among the citizens because waste management services are widely considered a public good.
- However, steeply increasing charges (or improving coverage by decreasing exemptions or enforcing payment) is usually associated with high political costs.
- Unit-pricing models have a higher potential for high political acceptance in comparison to flat-rate charges at the same average level.

# Municipal Waste Charges

## Recommendations

- If there is political will to raise municipal waste management charges in order to strengthen cost-recovery, the introduction of unit-pricing models is indicated as those models not only best realize the polluter-pays principle but also generally enjoy a higher acceptance in comparison with flat-rate or unrelated variable charges.
- Pre-paid bag models of unit-pricing are comparatively easy to administer and create significant incentives for waste reduction and better separation.
- In order to minimize the risks associated with the potential revenue volatility of unit-pricing models, hybrid systems should be introduced, where basic charge covers the structural costs of waste management services and an additional variable charge covers the operational service costs.
- In countries with considerable inflation, waste charges (like other service charges) should be adapted to inflation on a regular basis. A possible model is the *Unidad de Fomento* in Chile. Its value is daily adapted to inflation and rates for the waste charge are specified in this unit.
- Waste charges should be complemented by some element to cushion the regressive effects of the charges. In hybrid-models, the basic charge can be adjusted for household income or property value. Another option are exemptions for poorer households.

## Landfill Taxes

**Landfilling of untreated waste is generally the worst option as it is associated with a number of negative environmental and social impacts:**

- emission of greenhouse gases;
- the danger of leakage of hazardous substances
- negative amenity effects for neighboring communities, and
- negative environmental effects arising from transport.

**Hence, landfill taxes are implemented with the objective to internalize external costs and to create incentives for to use more environmentally friendly methods of waste disposal.**

## Landfill Taxes

Landfill Taxes	
Environmental Effects	+
Revenue	+
Market Effects	0
Social Effects	0*
Administrative Costs	++
Political Acceptance	++
<p>* The neutrality of the social effects is only achieved if the landfill tax is included in a wider scheme of Environmental Fiscal Reform, like for example in the UK, where insurance contributions were lowered at the time of introduction. Otherwise the social effects will be slightly negative as the tax will slightly increase consumer prices.</p>	

## Landfill Taxes

### **Environmental Effects** (reducing amount of waste deposited in landfills)

- Landfill taxes provide a continuous economic incentive for local authorities and large industrial companies to reduce landfill disposal
- Introduction of landfill taxes can force municipalities to rapidly introduce separated collection of recyclable materials.

### **Revenue Effects**

- Revenue collected from landfill taxes is low compared to other taxes.
- However, landfill tax constitutes a comparatively stable source of revenue
- If incentives are successful, revenue from landfill tax will decrease over the long-term.

# Landfill Taxes

## Market Effects

- Landfill tax costs are generally assumed to be passed on to the consumer either through the municipal waste charges or through increased prices as businesses pass on costs associated with waste disposal to consumers.

## Social Effects

- Landfill taxes slightly increase the costs of consumer products.
- However, due to their comparably low rate, this effect is not very significant
- in the UK the introduction of the landfill tax was accompanied by a wider move in the direction of a holistic Environmental Fiscal Reform (EFR): when the landfill tax was introduced social security contributions were reduced.

## Landfill Taxes

### Administrative Costs

- For collection only the monitoring of a limited amount of sites is necessary → low administrative costs.

### Political Acceptance

- In those countries where the tax is implemented it is widely accepted.

# Landfill Taxes

## Recommendations

- Landfill taxes can be implemented as a revenue generating tool creating additional incentives to support command-and-control regulation concerning landfilling, like for example mandatory landfilling and recycling quotas. In these cases landfill taxes create incentives to potentially outperform the quotas mandated by law.
- Tax rates should be significantly high in order for the tax to create meaningful incentives.
- The introduction of landfill taxes should be integrated in a holistic EFR approach, where the introduction of this tax is coupled with a parallel reduction in social security contributions.
- Confronted with the problem of unregistered dumpsites, a regulation making the owner of the land responsible for paying the tax in the case no operator can be identified seems to be practicable.

## Landfill Allowances Trading Scheme

- The UK has introduced a certificate trading mechanism for biodegradable municipal waste in order to reduce its disposal in landfills and allow for flexibility.
- This model is uniquely implemented in the UK to date.

Landfill Allowances Trading Scheme	
Environmental Effects	+
Revenue	0
Market Effects	0
Social Effects	-
Administrative Costs	+ +
Political Acceptance	+

# Landfill Allowances Trading Scheme

## Environmental Effects

(diversion of biodegradable municipal waste from landfills)

- In the UK 40 per cent less biodegradable waste is landfilled today than before the introduction of the scheme in 2005/06

## Revenue Effects

- Potentially through auctioning of permits
- None in the UK, because permits are distributed for free

## Market Effects

- No significant effects.

# Landfill Allowances Trading Scheme

## Social Effects

- Additional costs are assumed to be passed on to the consumer.
- Since permits are not auctioned in UK, no significant costs are associated.

## Administrative Costs

- In the UK, landfill operators are required to keep records for implementation of LATs.
- Is considered a minor effort.

## Political Acceptance

- Widely accepted in the UK

# Landfill Allowances Trading Schemes

## Recommendations

- The implementation of a permit trading system is a potentially effective tool to reduce the landfilling of specific waste streams. However, in the presence of landfill taxes at a significant rate, its implementation seems to be redundant.

## Deposit-refund Systems

- create incentives for returning products after the end of their useful-lives
- can be implemented, where
  - the product or its packaging keeps integrity throughout life-cycle
  - there is a significant risk of illegal dumping
  - the costs of illegal dumping are high (e.g. toxic products)

Deposit-refund Schemes	
Environmental Effects	++
Revenue	0
Market effects	-
Social Effects	0
Administrative Costs	-
Political Acceptance	-

# Deposit-refund Systems

## Environmental Effects

(increase of return and recycling rate)

- Where implemented, deposit-refund systems have proved to successfully increase return rates (up to 97%)

## Revenue Effects

- None

## Market Effects

- Additional administrative burden for affected industries.
- No significant competitiveness issues, as deposit is usually also mandatory for import products.

# Deposit-refund Systems

## Social Effects

- Cost neutral for consumers

## Administrative Costs

- Limited to comparatively small monitoring costs when handling costs are borne by industry.

## Political Acceptance

- Generally high public acceptance
- Risk of strong lobbying on behalf of industry, because specific products are targeted.

## Deposit-refund systems

### Recommendations

- Deposit-refund systems are effective instruments to increase the recycling rate for specific products. They should be increasingly introduced not just for packaging waste but also for other products where the risk for and/or costs of illegal dumping are significant (e.g. batteries).

## Advanced Recycling Fees

- Paid by the consumer on product sales
- used to cover the cost of recycling
- usually assessed per unit of the product sold
- Determination of rates by and collection by a public authority or mandated body.

Advanced Recycling Fees	
Environmental Effects	+
Revenue	+
Market Effects	+
Social Effects	-
Administrative Costs	- -
Political Acceptance	+

# Advanced Recycling Fees

## Environmental Effects

(increase recycling rate)

- In the cases examined, introduction of ARFs proved successful in creating a market for recycling and increase the recycling rates of the products significantly.

## Revenue Effects

- Desired outcome: revenue-neutral
- Cases examined show difficulties to adequately project actual recycling costs

## Market Effects

- No negative competitiveness effects observed
- ARFs are effective in creating new markets for recycling

# Advanced Recycling Fees

## Social Effects

- ARFs pass costs of recycling on to the consumer

## Administrative Costs

- Rather high due to inclusion of handling costs and high amount of retailers involved.

## Political Acceptance

- Generally high in the cases examined.

## Advanced Recycling Fees

### Recommendations

- Advanced Recycling Fees have proven successful in creating recycling markets for waste streams where recycling would otherwise not be economically efficient.
- Their implementation should increasingly be considered for electronic products
- For efficient implementation, more experiences will have to be evaluated in order to improve administration and cost projections
- A potential combination with deposit-refund systems should be evaluated in order to increase return-rates.