OECD perspectives on material management

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What is the OECD?

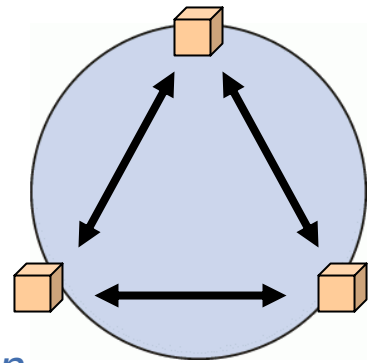
- Organisation for Economic Co-operation and Development
- A **forum** to compare experience, discuss common problems and develop policy responses, and hold governments accountable to implement them through the peer review processes.
- **30 member countries** with a shared commitment: market economy, democratic principles and respect for human rights.
- A **Secretariat** which provides policy analysis and advice.

Who drives OECD work?

Council

Oversight and strategic direction

Representatives of member countries and of the European Commission; decisions taken by consensus



Committees

Discussion and implementation

Representatives of member countries and countries with Observer status work with the OECD Secretariat on specific issues

Secretariat

Analysis and proposals

Secretary-General
Deputy Secretaries-General
Directorates

Annual budget: 188 million euros

Funded by member countries

OECD policy framework for Sustainable Development

- Wider use of markets
- Stronger policy coherence
- Harness science and technology
- Manage links to the global economy

OECD Environmental Strategy for the First Decade of the 21st Century

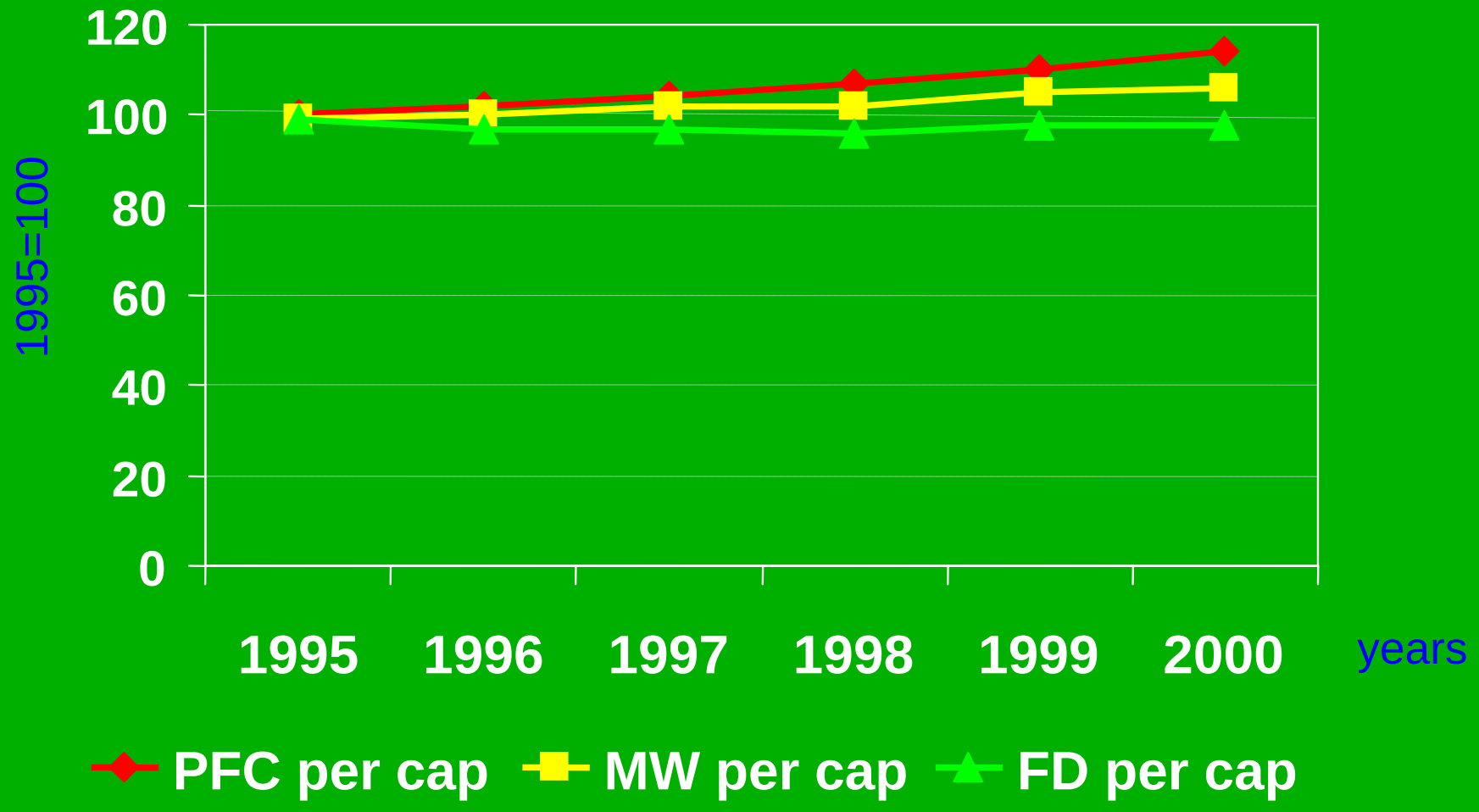
- Maintaining the integrity of ecosystems through efficient management of natural resources (with emphasis on freshwater, climate change, and biodiversity)
- De-coupling environmental pressures from economic growth (with emphasis on agriculture, energy, transport and waste)
- Improving information for decision-making: Measuring progress through indicators
- The social and environmental interface: Enhancing the quality of life
- Global environmental interdependence: Improving governance and co-operation

The role of developing countries is increasingly important, but OECD countries must take the lead.

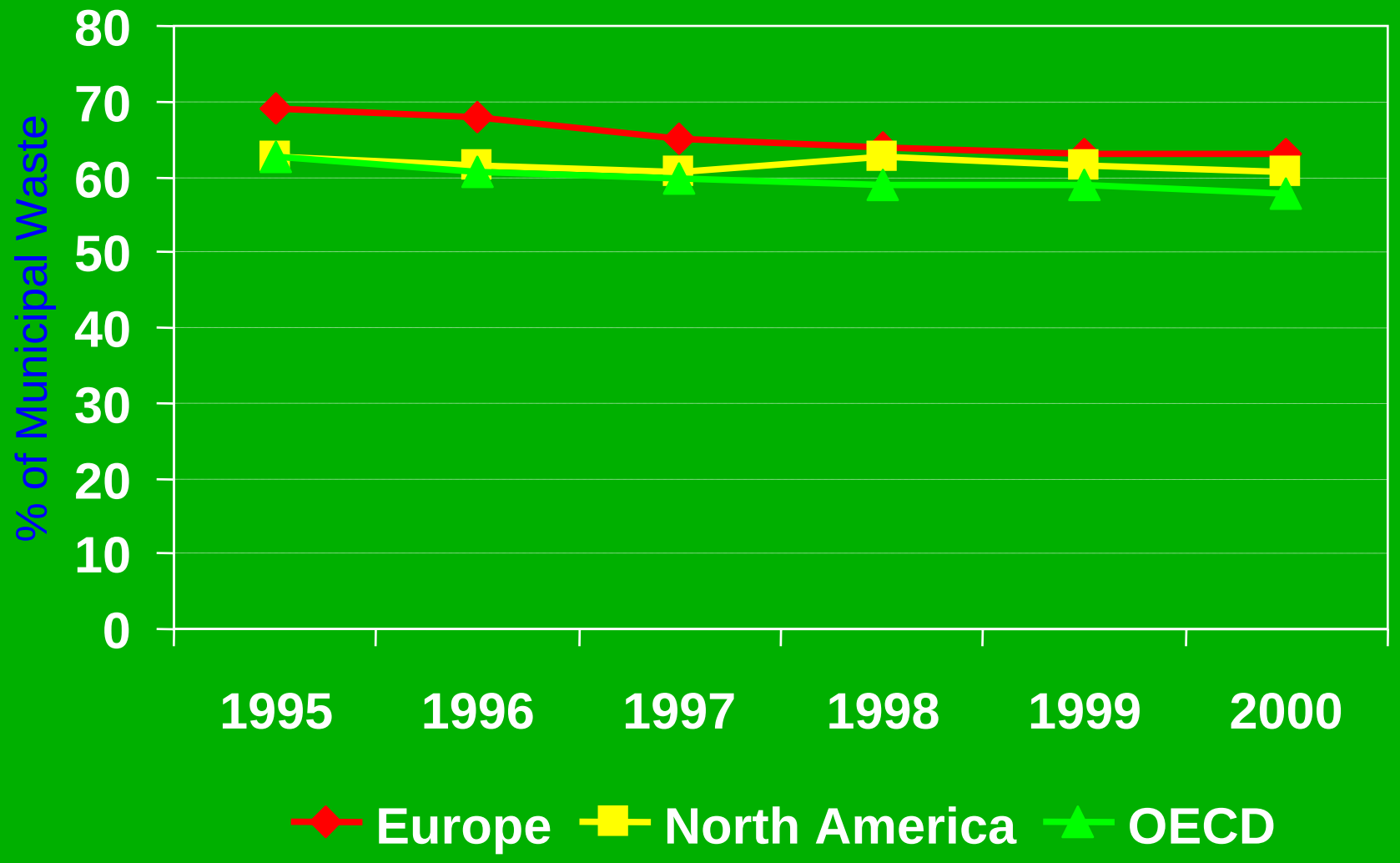
OECD analysis of trends in material flows and waste: decoupling

- Structural change has led to a discernible trend in the relative decoupling of material throughput (direct material input) from GDP and of per capita material use from per capita GDP.
- At high levels of GDP per capita there is evidence of saturation effects regarding material use and waste generation.
- When growth in GDP or final private consumption no longer drive material use, demographic factors take over such as population growth, household size and age structure. In the EU and some other OECD countries, the balance of trends in these factors may work to reduce the desired demand for raw materials in future.
- This may lead to some absolute decoupling of material use from GDP but has not happened yet.
- Increased recycling and improved methods of final disposal have, however, already led to some absolute decoupling of the environmental pressures themselves even though absolute levels of material use and waste have continued to increase.

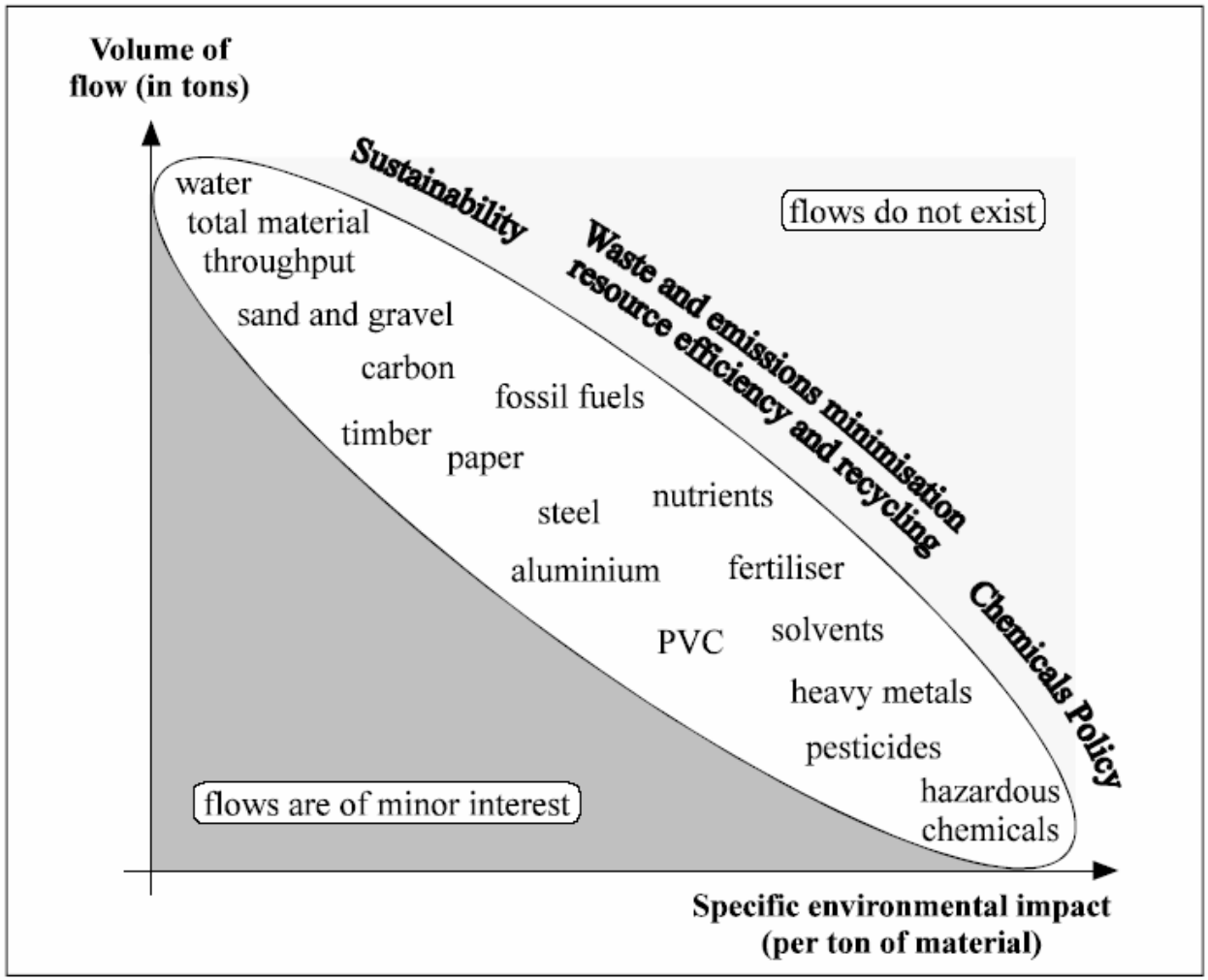
OECD – Trends (per capita) in: private final consumption (PFC), municipal waste generation (MW), and final disposal (FD: landfilling & incineration)



Share of municipal waste destined for final disposal in OECD regions



Stylised map of materials of interest for flow accounting



Indicators based on material flow accounts

- Direct material consumption (DMC) per capita declined form 16.2 tonnes to 15.6 tonnes in EU-15 countries between 1980 and 2000.
- Outputs of some hazardous materials such as sulfur oxides and heavy metals have been regulated and successfully reduced or stabilized, but outputs of many potentially harmful materials continue to increase.
- For example, in the U.S. from 1975 to 1996, direct material output (DMO) flows of materials that are potentially toxic or hazardous increased by 30 per cent to over 400 million tonnes, primarily synthetic organics and fosil fuel by-products.

Produce and consume *differently,* not necessarily less...

- Government has a role in addressing market and institutional failures linked to the production and consumption of consumer goods and services.
- It is resource use and environmental pollution that have to be brought to sustainable levels, not the consumption of products and services as such.
- Establishing an efficient level of decoupling for a particular environmental resource or sink ideally would involve ensuring that all external environmental costs are reflected in product prices, and then allowing the market to determine the appropriate level of use at the established price.

OECD policy analysis is based on a life-cycle approach

- **Policy measures** need to address as directly as possible the environmental externalities in extraction, transformation, production, use, and disposal.
- These interventions should be made at the **appropriate points** in the life cycle of material flows and products.
- Some policies need to **target producers and waste facilities**; others need to target households and other end users; others are needed to make markets work better which will affect both producers and end-users.

Sustainable materials management

- An integrated set of policy approaches targeted on economic agents at various intervention points throughout material and product lifecycles;
- Designed to result in economically efficient and environmentally sustainable resource use by internalising environmental externalities.
- The product life cycle includes all human activities related to material selection, exploration, extraction, transformation, processing, consumption, recycling, and disposal.

OECD analysis of policies targeted on intervention points and agents

- **Addressing producers**
  - ecoefficiency
  - firm behavior
  - extended producer responsibility and links to integrated product policy
  - waste management contracts for environmentally sound disposal
- **Addressing end-users**
  - green public purchasing
  - household consumption
- **Cross-cutting**
  - markets for recycling
  - applying economic instruments to waste-related issues

Addressing producers through economic instruments

- Subsidy reform
- Environmentally related taxes
- Domestic transferable permit systems
- Voluntary agreements

OECD analysis of survey data on eco-efficiency and the firm (1)

- Questionnaire based survey of more than 4000 facilities in 7 countries classified by 24 sectors; includes both large firms and SME's.
  - Do different types of public policies result in different organisational responses?
  - How can public authorities support the introduction of environmentally sound management practices?
  - How can scare public resources be better targeted to ensure improved environmental performance of both leaders and laggards?
- Facility characteristics are important.
  - Size, multi-facility firm, profitability, international, ,foreign head office, presence of quality management, positive regulatory incentives all increased likelihood of having an EMS.
  - An EMS increased likelihood of cleaner production vs end-of-pipe
  - Having an environmental accounting system is positively associated with environmentally-related R&D.

OECD analysis of survey data on eco-efficiency and the firm (2)

- Impact of public policy is significant
  - Policy stringency is the single most important factor driving environmental management, physical investment, technological innovation and reported performance.
- Decision to establish an EMS
  - Perceived reduction in the frequency of inspections is the most important factor.
  - The second most important factor is the provision of public financial support.
- Cleaner production versus end-of-pipe
  - Performance standards and economic instruments increase the liklihood of CP.
  - Recognition of an opportunity for cost savings is also important.
- Superior environmental performance has a positive impact on profitability.

OECD analysis of policies to implement extended producer responsibility (1)

- Case studies of packaging waste, batteries, electrical and electronic equipment (EEE), and end-of life vehicles.
- Criteria were environmental effectiveness and economic efficiency.
- Market imperfections clearly warrant some intervention, but the case is stronger for materials with relatively low end-of-life value linked to potentially high environmental impact.
- The sum of the environmental and economic benefits should outweigh costs over the product life cycle.

OECD analysis of policies to implement extended producer responsibility (2): key findings

- EPR schemes generally increased recycling rates by mobilizing additional resources, but mandatory recycling rates and material bans, while environmentally effective, were less economically efficient.
- Apparently created effective feedback for design for environment (DfE).
- Covered a variety of products but focus was on those with high volumes, difficult to manage, and containing hazardous substances.
- Voluntary schemes concentrated on products with high end-of-life values and where consumer preference for DfE could increase market share, but often encountered free-rider problems.
- Deposit-refund schemes were most effective to make collection schemes work, but the fees needed to be set by the producers to have maximum effect.
- Facilitated by existing infrastructure for waste collection and separation.

Policy tools for household sustainable consumption: some examples

Economic Instruments: *e.g.* waste fees, taxes on energy and water use, deposit-refund schemes for beverage bottles and batteries, removal of water subsidies, subsidies for green energy, tradable permits for municipal waste, green tax reform…

Regulatory Instruments: *e.g.* regulation on environmental labels and "green" claims, waste management directives, energy-efficiency standards, extended producer responsibility regulation, statutory pollution emissions targets, water quality standards, product bans…

Social Instruments: *e.g.* public information and environmental awareness campaigns (on waste, energy, water, transport), education, public debate and participatory decision-making processes, support to voluntary citizen initiatives, partnerships with other actors (private sector, NGOS, etc.)…

Other Tools: *e.g.* state of environment assessment and goal setting, development of sustainable consumption indicators, incentives for environmentally superior technological innovation and diffusion, infrastructure provision, zoning and land-use planning…

OECD analysis of policies targeted on markets for secondary waste

Table 8. Types of Market Failure and Associated Public Policies

Classification of Market Failure	Example of Waste Stream Potentially Affected	Relevant Public Policies to Address the Failure
Transaction Costs	Used structural timber, used motor oil, construction and demolition waste	Development of standardised contracts, waste quality grading schemes, support for web exchanges
Information Failure	Plastics, used newsprint, used motor oil	Grading schemes, testing/certification programmes
Consumption Externalities	Construction and demolition waste, retreaded tires	Demonstration projects, public procurement
Technological Externalities	Glass bottles, plastic film, complex metal alloys	Product standards, support for 'design-for-recycling' innovation
Market Power	Aluminium scrap, used newsprint, rubber tires	General competition and anti-monopoly policy

Technological externalities (1)

- Products are often designed in ways that impose downstream recovery costs (i.e. inking technologies in printing, mixing resins in plastics, constituents in metal alloys)
- All of these provide real benefits, or would not be undertaken by manufacturers (or imposed by regulatory authorities)
- However, such benefits may not outweigh the downstream costs – if markets are ‘missing’ no means to transmit relevant information and incentives.

Technological externalities (2)

- **Leads to socially inefficient product design** - particular problem for plastics, glass, construction and demolition waste, and 'composite' products

- **Public policy implications**:
  - tax & subsidy schemes (differentiated according to ease of recovery)
  - take-back schemes (which do not restrict competition or impose excessive private and public administration costs)
  - support for separation and recovery technologies (perverse scale effects)
  - apply product 'standards' which take into account net marginal social costs downstream

OECD analysis of targeted policies to improve solid waste management (1)

- A seminar on the economics of waste identified market failures as responsible for products which are too heavy, too complex, and too difficult to recycle as well as household behavior responsible for too much waste, too little re-use, and too little recycling.
- Empirical evidence supported giving priority to key policy instruments
  - Advance differentiated disposal fees equal to the net recycling cost.
  - Trash collection charge equal to the excess of collection and disposal cost over the net recyling cost.
- But illegal dumping, high administrative costs, distributive effects, multifamily housing, high recycling costs all can change this even leading to need for subsidies.

OECD analysis of targeted policies to improve solid waste management (2)

- However, a mix of taxes and subsidies is clearly superior to non-tax policies such as recycling targets, recycled content mandates, and landfill bans.
- Obstacles to the greater use of market instruments
  - Administrative instruments easier to apply
  - Policy makers still sceptical regarding price elasticities
  - Preference to hide costs rather than make them explicit

The UK Landfill Tax

- **Methodology**
  - Multidisciplinary research team
  - Benefits transfer for a range of environmental impacts
  - Separate estimate of landfill disamenity

- **Results**
  - Best estimate for landfill externality - £5 pt of waste
  - Splits £2 pt for inactive and £7 pt for active waste
  - Incineration with energy recovery a net environmental benefit but depends on type of energy production displaced

UK (2)
Key features of the new tax

- Covered all licensed waste to landfill
- Tax by weight set at £7pt for active waste, £2pt for inactive waste
- Revenue from tax recycled to businesses through social security contributions reduction
- An Environmental Trust set up based on tax breaks for landfill operators

UK (3)
Development since tax introduced

- Standard rate raised to £10 pt in 1999 with £1 pt escalator to £15 pt in 2004
- Commitment of increasing to £35 pt in the medium term
- Environmental fund (partly) redirected to public spending
- Future additional revenues to be recycled back to businesses and local authorities

UK (3)
Has the tax been a success?

- Less inactive waste landfilled
- Stable levels of active waste to landfill
- Standard rate of tax significantly increased
- New policy instruments, especially landfill allowance trading

Norway (1)
Expected effects of an emission tax on incineration of waste

- Emissions depend on incineration technology, cleaning technology and the kind of waste being burned
- The current tax on final waste treatment leads to increased source separation
- A tax on emissions will also create economic incentives to
  - change incineration conditions
  - clean emissions
  - sort out certain types of waste

Norway (2) – Tax on landfills

- Methane emissions from landfills amount to 7 percent of Norway's total emissions of climate gasses
- Impossible to measure methane emissions from landfills
- A tax on municipal waste (80 percent organic waste) approximately equal to the environmental cost
- Methane emissions depend on
  - amount of carbon in the waste
  - technical conditions at the landfill
  - climate
- Practical conditions make differentiation of the tax difficult
- The tax is now differentiated according to technical conditions of the landfill

Norway (3)
Measures to stimulate energy production from waste

- Utilization of energy from waste does not reduce the emissions from incinerating waste
- The differentiated tax on incineration is lower than the environmental costs from incineration waste
- Economic motives for waste reduction is decreased
- A subsidy according to the amount of energy produced is a more accurate measure
- A subsidy should be given to all producers of energy from waste

Norway (4)
Summing Up

- The waste tax put a price on the environmental damages caused by waste treatment
- A tax on emissions will give incentives to reduce emissions
- A tax on emissions from incineration of waste will be introduced 1 July 2004
- A subsidy according to the amount of energy produced will be given to landfills and incinerators
- The tax on landfills is differentiated according to the technical conditions at the landfill

OECD accountability mechanisms (1)

- Policy guidance developed through performance reviews and OECD Council Acts.
- Periodic review by peers exerts political pressure for improvement although non-compliance is not subject to judicial remedy.
- Recent relevant Council Acts
  - Improving the Environmental Characteristics of Public Procurement [C(2002)3].
  - Environmentally Sound Management of Waste (ESM) [C(2004)100]
  - Material Flow Accounts [C(2004)79]

OECD accountability mechanisms (2)

- **Objectives of the Council Recommendation on Environmentally Sound Management of Waste**
  - Sustainable use of natural resources, minimisation of waste and protection of human health and the environment from adverse effects that may result from waste;
  - Fair competition between enterprises throughout the OECD area through the implementation of "core performance elements" (CPEs) by waste management facilities, thus contributing to a level playing field of high environmental standards;
  - Through incentives and measures, diversion of waste streams to the extent possible from facilities operating with low-standards to facilities that manage waste in an environmentally sound and economically efficient manner.

Further OECD work in support of sustainable material management

- International policy inventory
- Integration of material management policies with other sustainable development objectives
- Policy approaches to further engage the private sector
- Standardization of SMM methodologies including for Material Flow Accounting
- Development of SMM performance indicators

For Further Information on OECD Work

http://www.oecd.org/env