

Packaging — Energy recovery from used packaging

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National foreword

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English version

Packaging — Energy recovery from used packaging

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SUMMARY

of the CEN/TC 261/SC 4/WG 4 Technical Report of 4 December 1993, titled
"Energy Recovery from Used Packaging"

The European working group on "*Energy Recovery*" (WG 4) of the "*Packaging and the Environment*" sub-committee of the European Committee's for Standardization (CEN) "*Technical Committee on Packaging*" (TC 261) has reviewed existing knowledge and experience of technology and practice for recovering energy from combustible used packagings.

Energy recovery from municipal solid waste (MSW) plays an important role in integrated systems for resource and waste management. This is predominantly through mass burning MSW, and includes utilization of refuse-derived fuel (RDF) and packaging-derived fuel (PDF). Combustible used packaging contains a significant portion of the energy content within MSW, and has good fuel characteristics.

While, on average, about 20 per cent by weight of MSW in Europe consists of combustible used packaging (containing wood, paper, and plastics), this fraction represents at least 40 per cent of the energy content of MSW.

Presently some 28 per cent by weight of all MSW produced in Western Europe is incinerated, and energy is recovered from 23 per cent of the total. This corresponds to about 7 million tonnes of combustible used packaging, which makes energy recovery one of the recovery options for used packaging most widely in use.

There is, however, technical and commercial potential for a considerable increase in energy recovery from used packaging. The total potential amounts to nearly 30 million tonnes a year, which is equivalent to more than 14 million tonnes of oil. A forecast indicates that by the year 2000 nearly two thirds of the amount of packaging consumed in Europe will be a potentially valuable fuel for thermal energy generation.

Since packaging in a majority of applications is subject to functional and legal requirements, which do not normally apply for alternative uses of the material, combustible used packaging has generally lower contents of toxic substances and heavy metals. Such legal requirements are found in food contact legislation, and in legislation such as the CONEG laws in the U.S.A., which apply to all packaging. Energy recovery has the additional advantages of reducing potential bacterial hazards, providing stable landfill material (which may be considered for road building and other

applications), and reducing the need for space for and management of landfills.

A large amount of information about established technology and practice suitable for the clean production of energy from MSW exists. Techniques for waste treatment (sorting, shredding, etc.), combustion, and emission abatement with a long record of industrial use and well suited for thermal energy recovery from MSW are commercially available.

Fuel properties of technical and economic importance, such as heat value, ash content, etc., can be determined using internationally recognized standard methods, as can emissions from boiler plants. Experience and results from such measurements and evaluations are well documented in the scientific and technical literature.

Evidence shows that there are considerable advantages in utilizing energy from MSW, and, particularly, from the combustible part of used packagings. The required technology is commercially available, including highly efficient pollution control systems. These technologies are subject to continuous development and improvement.

FOREWORD

This technical report considers the recovery of energy from used packaging - within municipal solid waste (MSW) or as a refined, cleaner fuel - and has been prepared by experts of the CEN working group TC 261 (*Packaging*)/SC 4 (*Packaging and Environment*)/WG 4 (*Energy Recovery*). The working group has reviewed existing knowledge and experience related to technology and practice for recovering energy from combustible used packagings.

The role of used packaging within an integrated philosophy of resource management is assessed. The value of used packaging as a fuel is discussed, together with a review of its characteristics and potential environmental impact.

The terms used in the report are explained in an Appendix.

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CHAPTER 1. INTEGRATED RESOURCE MANAGEMENT

All activities consume resources, create wastes, and have some impact upon the environment. According to one model biophysical resources (energy and materials) flow from the ecosystem into the economy, while degraded products flow (as pollution) back into the ecosystem (Siddayo 1993). As society has grown in size and complexity, resource consumption and waste creation have also increased, causing louder demands for higher standards of environmental protection. Differences in national standards and practices can create barriers to trade, which should be overcome through harmonization where possible.

The World Commission on the Environment and Development (Brundtland Report, 1987) declared that the world should strive for sustainable development to *"meet the needs of the present without compromising the ability of the future generations to meet their own needs"*. Amplifying this theme, the fifth environmental action programme (*"Towards Sustainability"*) of the European Commission (EC) set down a philosophy towards the management of wastes as: minimization (prevention), re-use, material recovery (recycling), energy recovery, incineration without energy recovery, and landfill. Of course, each of these activities themselves consume resources and create wastes, which must be fully considered when assessing the best practicable environmental options. The waste produced by people at home and at work - municipal solid waste (MSW) - is clearly a waste of no further value to those who produce it. Yet MSW in general, and in particular combustible used packaging material within it, remains a resource with some residual value.

The amount of MSW created is now typically around one kilogram per person per day. Figure 1.1 illustrates the principal options available within an integrated resource and waste management scheme for packaging.

The EC recognises the need for an integrated view on resource and waste management taking all options into consideration when striving for the best possible solution. The 1991 EC Framework Directive on Waste stipulates that Member States must adopt appropriate measures to prevent or reduce waste production and environmental impact by re-use, recycling, and recovery to obtain energy or secondary raw materials from the waste.

Energy recovery is one of the resource management options to be considered together with re-use and material recovery. It is important to recognize that local conditions are relevant factors when making waste management decisions.

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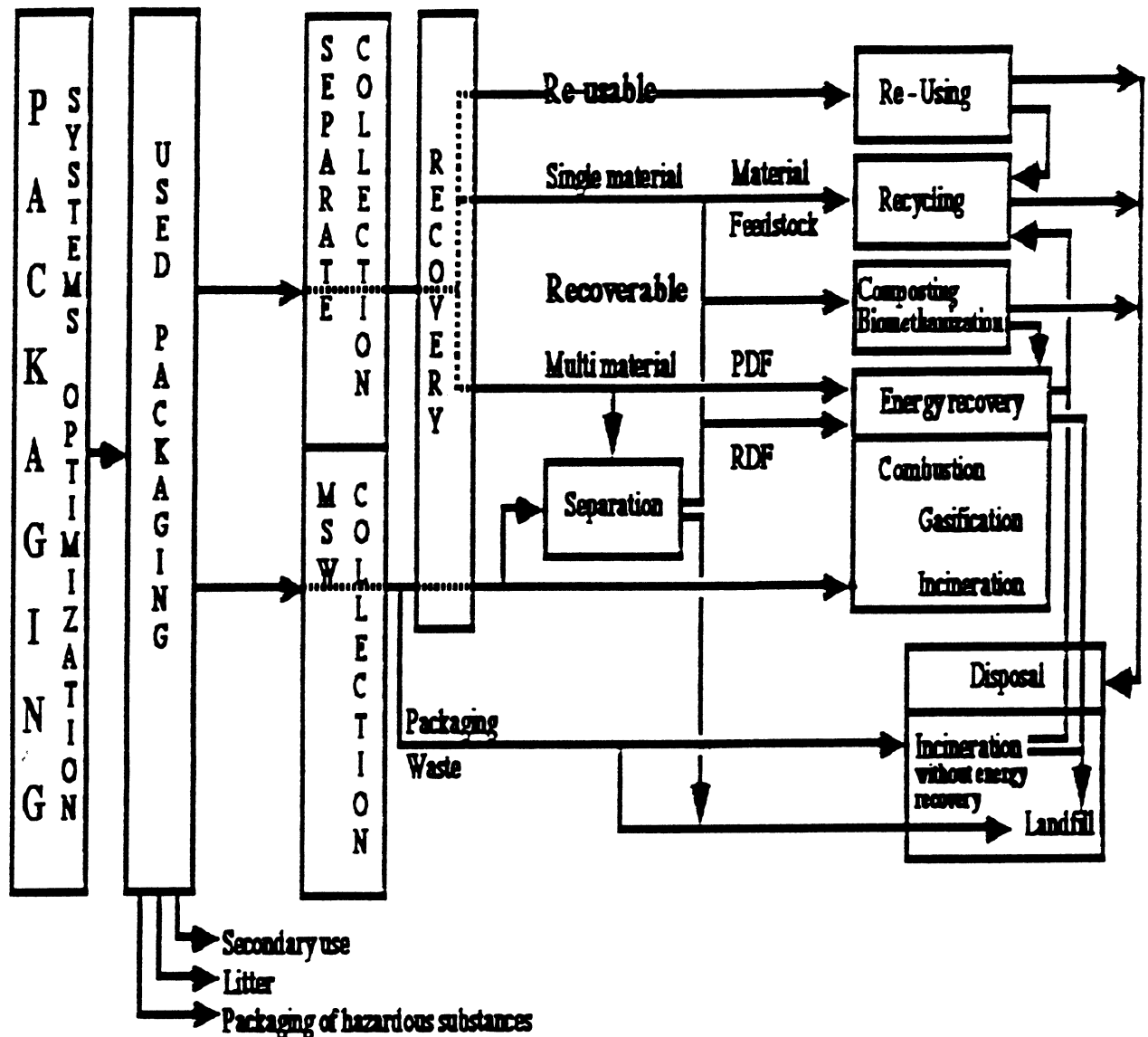


Figure 1.1. Flow chart showing an example of possible resource recovery options. MSW = Municipal solid waste; RDF = Refuse-derived fuel; PDF = Packaging-derived fuel.

Towards the end of the 1980's, the annual generation of all solid wastes within the EC was estimated at more than two thousand million tonnes, as shown in Table 1.1 (Renaux 1993).