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EXTENDED PRODUCER RESPONSIBILITY

PHASE 2

CASE STUDY ON THE DUTCH PACKAGING COVENANT

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FOREWORD

Many OECD countries -- in accordance with the Polluter Pays Principle (PPP) -- are taking measures to expand private sector responsibility for conserving resources and energy and reducing the quantity of pollutants released and wastes destined for final disposal. This approach of Extended Producer Responsibility (EPR) is aimed at making the private sector responsible for efforts to reduce environmental impacts from both use and disposal of their products and to use and benefit from recycling, recovered resources and reclaimed materials in so doing.

In 1994, an OECD project on EPR was initiated, focusing particularly on programmes to address what many regard as the “weakest link” in the product responsibility chain: the final disposal of products after their sale to and use by consumers. The overall themes of each phase under the EPR Project are:

- Phase 1* *Review of legal and administrative approaches in OECD Member countries and development of initial policy options for EPR programmes (1994-1995);*
- Phase 2* *Analysis of economic efficiency and environmental effectiveness of various approaches to EPR (1996-1997); and*
- Phase 3* *Examination of EPR approaches and issues through a series of multi-stakeholder workshops, culminating with a joint workshop combining efforts under EPR and Waste Minimisation OECD work programmes. Synergies are expected and the joint workshop outcome will serve as input to the development of comprehensive policy options (1998-1999).*

The *Phase 1* Report was based on extensive interviews and information gathered across the OECD area and was published in 1996 (OECD Environment Monographs No. 114, OCDE/GD(96)48).

Phase 2 consists of four areas: *a)* in-depth case studies on existing EPR systems, *b)* possible trade implications, *c)* economic analysis of EPR options, and *d)* development of an overall “Phase 2 Framework Report” for implementing EPR programmes with a particular focus on the policy and legal considerations for sharing responsibility.

This in-depth case study focuses on the **Dutch Packaging Covenant**, a negotiated agreement which was concluded in 1991. The case study was originally drafted by Frank Neumann, who was a consultant to the OECD in 1995-1996. He is currently a Senior Researcher at the Erasmus Center for Environmental Studies of the Erasmus University in the Netherlands. The final draft was produced within the OECD Secretariat by Alain Rajotte. It was prepared for publication with the help of another consultant, John Smith.

Delegates to the Pollution Prevention and Control Group have had the opportunity to review this document and have agreed that it should be declassified. It is published under the authority of the Secretary-General of the OECD.)

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EXECUTIVE SUMMARY

Objectives of the study

Phase 2 of the OECD Project on Extended Producer Responsibility (EPR) started in 1995 by focusing on the analysis of the economic efficiency and environmental effectiveness of various approaches to EPR. Among other work, two in-depth case studies have been undertaken on the Dutch Packaging Covenant and the German Packaging Ordinance. Both approaches provide examples of the implementation of an EPR programme. Each approach entails distinct characteristics, as the Dutch approach is a negotiated agreement while the German regime is mandatory. Both approaches have been carefully evaluated, providing a good basis for comparison.

In this report, the Dutch Covenant approach and, more particularly, the Dutch Packaging Covenant as a policy tool for implementing the Extended Producer Responsibility (EPR) principle are reviewed and discussed. The benefits and shortcomings of the Packaging Covenant are evaluated both quantitatively and qualitatively. Environmental implications, impacts on resource efficiency, technology innovation, and effects on industrial competitiveness are assessed. The evaluations have been executed by using the SIDE-model, an analytical framework developed jointly by the Dutch Ministry of Physical Planning, Housing and the Environment, Ministry of Agriculture, and Ministry of Economic Affairs.

EPR Principles and their legislative application

OECD Member countries are placing increasing importance on EPR as a policy approach for closing material cycles. Viewed as a powerful environmental policy instrument in a number of OECD countries, EPR has been the leading principle underlying take-back programmes, which require retailers, distributors and producers to take back products, e.g. packaging after consumer disposal. Take-back programmes can have a significant impact in reducing solid waste and improving the environmental attributes of consumer products. The examination of current national experiences for controlling packaging wastes may therefore provide insights with regard to the benefits and shortcomings of implementing EPR principles into concrete actions.

In the Netherlands, EPR is considered as a link between product policy and waste policy. Dutch product policy places particular emphasis on the responsibility of producers in seeking continuous reductions of the environmental impacts of products. The responsibility extends beyond emissions from production processes, to the choice and use of raw materials and the design of a product. It also covers environmental effects over the product's entire useful life-cycle and the post-consumer products. Correspondingly, waste prevention and recycling are key elements of the Dutch waste policy.

The Covenant as a tool for implementing EPR

Section 2 establishes the policy context in which EPR is being implemented in the Netherlands. The development and use of the Covenant approach are described, along with the content of the Dutch Packaging Covenant.

The first Dutch National Environmental Policy Plan (NEPP), introduced in 1989, has given a central role to the use of Covenants in implementing policy objectives. While maintaining existing legal instruments, the purpose of a Covenant, as an agreement between authorities and companies under private law, is to increase the flexibility to choose the optimal and most efficient ways of improving the environmental performance of activities through self-regulation. A unique feature of the Dutch approach in the Packaging Covenant is the combination of extended producer responsibility, life-cycle analysis (LCA) and market economic analysis (MEA) to optimise measures for pollution reduction with respect to packaging and packaging waste. These three key approaches are defined in Section 2. Appendix 3 gives the parameters used in conducting LCAs and MEAs, as well as the different steps and considerations for performing the analyses.

In order to meet the goals of the Packaging Covenant, the Government and the Foundation of Packaging and the Environment (FPE), which represents relevant industrial sectors, needed to agree on a series of measures to meet recovery targets. Some of the main requirements are discussed in Section 2, and Appendix 2 provides the detailed content of the Covenant.

The Content of the Covenant

Section 3 describes the main aspects of the Packaging Covenant. The principal stakeholders are identified, and their roles are defined. After a review of the main qualitative and quantitative objectives of the Covenant, the different instruments used to monitor progress in meeting the objectives are reviewed, including procedures for conducting LCAs and MEAs for different packaging alternatives. The main steps and components of the decision-making process are also defined. In addition, some implications of the EC Directive on Packaging and Packaging Waste for the Dutch national approach are examined.

Implications of the Packaging Covenant

Section 4 summarises the outcome of implementation of the Packaging Covenant in 1991-1994. Data on prevention, reduction at source, re-use and recycling are provided for different product categories.

Section 5 summarises the results of this case study, focusing particularly on the benefits and shortcomings of the Covenant approach. Recommendations for combining voluntary approaches with other policy instruments are given. In addition, elements of the Covenant approach that may be transposed to other policy contexts are identified. The section closes with the identification of issues which need improvement and/or development.

1. INTRODUCTION

The OECD work programme on Extended Producer Responsibility (EPR) called for studies of the use of EPR instruments. From an exploration of the EPR type of instruments used in the OECD area, the ones for packaging seemed to be the most fully developed. This report is the result of an in-depth case study of the Dutch Packaging Covenant, which came into force on 6 June 1991. The report is based upon interviews with key actors, and analysis of official policy documents, focusing on the 1990-1995 period.

In the Netherlands, EPR is considered to be a link between product policy and waste policy. Dutch product policy places particular emphasis on the responsibility of producers in seeking continuous reductions in the environmental impacts of products. The responsibility extends beyond emissions from production processes, to the choice and use of raw materials and the design of a product. It also covers the environmental effects over the product's whole useful life-cycle and the post-consumer products. Correspondingly, waste prevention and recycling are key elements of the Dutch waste policy. Considering the above objective, a unique feature of the Dutch approach is the combination of Extended Producer Responsibility, life-cycle analysis (LCA) and market economic analysis (MEA) in optimising measures for pollution reduction with respect to packaging and packaging waste.

A Covenant is an agreement between government and industry under private law. Covenants are also referred to as "negotiated agreements", in order to distinguish them from fully voluntary programmes. For the Dutch Packaging Covenant, companies *voluntarily sign up* to the collectively negotiated goals, but *they are then legally bound by its conditions*. The Covenant was undersigned by the Foundation for Packaging and the Environment (FPE), and its members are committed to contribute to the attainment of the negotiated collective goals. If goals are not met, legally this would be enforceable under civil law. Moreover, particularly for some companies that did not sign the Covenant, there was the "threat" that regulations would be enacted if the individual corporations did not undertake sufficient actions.

With respect to take-back aspects of the existing Covenant, these have been mainly arranged through existing channels. For glass, PET, cardboard, paper, etc., these channels were already functional through municipal structures as well as through corporations by means of deposits on bottles and tray packaging.

The Packaging Covenant was chosen for this case study, as it is one particular approach in use in an OECD country which has implemented EPR through a combination of waste prevention, product and material re-use goals, and product policy measures. Furthermore, the Packaging Covenant was implemented in 1991 and has now reached a critical stage with respect to goal attainment.

The goal of this case study is two-fold: (1) to provide an in-depth study of an EPR programme set up from a life-cycle perspective; and (2) to extract from this case study the approaches and instruments that were considered effective, and that seem feasible for use in other countries.

The following specific questions were to be addressed by this study:

1. How are specific EPR strategies structured?
2. How are the goals set?
3. What kind of goals are set?
4. Did EPR stimulate innovation?
5. How is progress measured?
6. What are the foreseen (and unforeseen) effects?
7. Are the policy actors satisfied with the achievements?
8. What are the benefits of EPR in relation to the costs?

The questions will be examined using the model for Sustainable Industrial Development (hereafter referred to as SIDE-model), developed by the Conference on Sustainable Industrial Development of the Dutch Ministries for the Environment, Agriculture and Economic Affairs.¹ and adapted for this case study. The four elements of analysis that characterise the model are: (1) improvement of environmental quality from a life-cycle perspective; (2) competitive fitness of industry; (3) resource efficiency; and (4) innovative improvements of products and processes.

The main purpose of the SIDE-model is to provide a comprehensive framework of reference for the analysis of the effectiveness and efficiency of the Covenant approach. It is a systematic tool that allows for a qualitative as well as a quantitative assessment of the consequences of implementing the Packaging Covenant. The model is explained in Section 4.

¹ Adapted framework, originally developed by Arthur D. Little for the Netherlands Ministries of Physical Planning, Housing and the Environment, Agriculture and Economic Affairs, in: "Sustainable Industrial Development; Sharing responsibilities in a competitive world," conference paper, February 1996, Amsterdam, p. 27

2. THE STATUS AND ROLE OF COVENANTS IN THE DUTCH POLICY CONTEXT

2.1 General characteristics of Covenants

The Dutch National Environmental Policy Plan (NEPP), which was introduced in 1989, has placed a central role in the use of Covenants to implement environmental policy objectives.¹ The main reason is that the use of command-and-control strategies and instruments only is presently considered ineffective for bringing about necessary changes in the behaviour of relevant parties. While maintaining existing legal instruments, the purpose of a Covenant, as an agreement between authorities and companies under private law, is to increase the flexibility to choose the optimal and most efficient ways of improving the environmental performance of activities through self-regulation.

The NEPP has also identified target groups that have a major influence on the implementation of environmental objectives. For each of these target groups, environmental policy objectives are set by the Government. For the sectors within these target groups, goals are negotiated with and within the respective sectors. Such sector agreements take the form of declarations of intent, one specific type of Covenant. **Table 1** lists the main themes and target groups identified in the NEPP.

In the context of the target group approach, two types of Covenants can be distinguished, i.e. product-related and process-related Covenants:

- Product-related Covenants are focused on the group of companies involved in the production or handling of a particular product. Examples include the packaging and car wreck Covenants. In the implementation of these Covenants, special institutional structures are usually set up for implementation and monitoring; and
- In the case of process-related agreements, the corporations belonging to the different sectors are invited by the provincial administration to make plans concerning how they will meet the sector level goals. The provincial authorities are also involved in monitoring and enforcement, when necessary.

There is now some experience with the use of Covenants as instruments for environmental policy, thereby providing preliminary results. In turn, there has been considerable debate on the advantages and disadvantages of the approach and related impacts. As such, the two strongest arguments in favour of the Covenants are that:

¹ In fact, the first Covenant, signed in 1987, concerned the elimination of phosphate in detergents. However, since the introduction of the 1989 NEPP, many Covenants have been adopted. There may be more than 100, according to a recent inventory conducted by the Dutch employer's organisation, VNO/NCW. See J.W. Biekart, "Environmental Covenants between Government and Industry – A Dutch NGO's Experience," *RECIEL*, Blackwell Publishers Ltd., USA, 1995, p. 142.

- Through the interactions of the different actors, all major parties are involved in the setting up of strategies. According to the main stakeholders, this methodology would have involved a considerable learning curve through the involvement of major players in the chain. Thus, the amount of creative, supported, and more efficient technical solutions generated is claimed to be higher than in the case of command-and-control-regulation; and
- Through the interactive and deliberative process, broad support for policy targets would be achieved, thereby facilitating implementation after policy approval and making it less conflictual. In addition, unequal costs as well as possible negative side effects for one or more of the partners would be avoided through such deliberation. These interactions would facilitate innovation and the search for low-cost solutions.

Table 1 - Themes and Target Groups of the National Environmental Policy Plan

Themes	Target groups
Climate change	Agriculture
Acidification	Traffic and transport
Eutrophication	Industry and refineries
Dispersion of toxic substances	Gas and electricity supply
Disposal of waste	Building trade
Disturbance	Consumer and retail trade
Dehydration	Environmental trade
Squandering of resources	Research and education
	Societal organisation

Source: *The Netherlands*, OECD Environmental Performance Reviews (1995), p. 34.

Conversely, two major arguments regarding the transparency of the process and implementation of policy objectives have been raised against the use of Covenants as a central policy strategy:

- As an agreement concluded under private law, the implementation of a Covenant is not subject to public control. This situation undermines the rights of concerned third parties to inquiry and appeal on the outcomes; and
- Without regulatory measures to support their intentions, Covenants would lack the “stick” to ensure compliance with targets and, therefore, would be ineffective in preventing “free riders”.

There is general agreement that the most recent Covenants have been better designed and integrated in an overall approach of public authorities.² Current strategies increasingly seek to combine voluntary agreements, incentives, and supporting regulations in order to maximise the effectiveness and

² J.W. Biekart, “Environmental Covenants between Government and Industry – A Dutch NGO’s Experience,” *RECIEL*, Blackwell Publishers Ltd., Vol. 4, No. 2, 1995.

efficiency of policy implementation. In addition, the obligation to comply with Directives of the European Union may imply some major consequences for the Covenant approach. For example, the Dutch Government may have to introduce regulations to comply with the Directives, thereby legally binding the private sector. Moreover, the implementation of these Directives may imply interministerial negotiations which are likely to reflect the relative importance of environmental protection and targets versus trade and harmonisation issues in the Dutch context.³

2.2 Specific characteristics of the Packaging Covenant

The momentum and rationale for using the Covenant approach to address waste issues were clearly spelled out by Minister Nijpels in a letter of 1988 attached to the Memorandum on the Prevention and Recycling of Waste:⁴

I regard this Memorandum as the beginning of a process that will cover all aspects of waste policy. To discuss with the concerned groups the targets, the measures and activities needed to achieve a more effective prevention and recycling of waste. It must be obvious that I expect more results from such an approach than from the one-sided use of legislation. Formulating an approach that is not carried by those concerned, is most difficult to uphold and therefore hardly brooking of success.

As already mentioned, the major argument for choosing a voluntary approach is related to an implementation gap in policy which has been mainly explained by the lack of support from relevant target groups. Thus, the Covenant approach is seen as a preferable tool to involve relevant target groups early in the decision-making procedure, thereby ensuring that any opposition to proposed measures would be minimised at the later stages of the policy process.

In the wake of the NEPP, the Dutch waste policy has been based on the 1988 Memorandum on the Prevention and Recycling of Waste. It sets reduction and recycling targets for 29 priority waste streams (now 30), among which packaging and packaging waste was one of the first priorities, and defines the way in which concrete actions should be negotiated with relevant target groups.

Table 2 lists the 30 priority waste streams that have been identified for concrete actions. As indicated in the table, packaging waste amounted to 3.2 million tonnes in 1991, representing a substantial portion of the total waste generated.

³ Ibid.: Indeed, the Netherlands had to introduce regulations to comply with the EC Directive on Packaging and Packaging Waste. Domestic procedural rules for transposing the Directive in national law resulted in interministerial negotiation involving, among others, the Ministry for Economic Affairs (EZ).

⁴ I.J. Koppen, "Regulatory Negotiation in the Netherlands: the case of packaging waste," in: P. Knoepfel, *Lösung von Umweltknöflikte durch Verhandlung*, Basel: Helbing & Lichtenhahn, 1994, p.159.

Table 2 - Priority Waste Streams (1990)

	(thousand tonnes)
Dredging materials (dry basis)	24 000
Manure (surplus)	17 500
Construction and demolition waste	12 400
Household waste	5 494
Sewage sludge	3566
Packaging waste	3200*
Commercial waste	2 873
Phosphoric acid gypsum	2 300
Shipping waste	2 278
Waste paper/cardboard	2 200
Street waste, market waste	1 300
Power plant ash	1 273
Municipal waste incineration residue	750
Bulk household waste	696
Polluted soil	630
Plastic waste	540
Scrap vehicles	494
Glass (non-refillable)	430
Jarosite	220
Shredder waste	140
Hospital waste	128
Blasting grid	125
Scrap in household waste	125
Oxylime sludge	124
Waste oil	101
Car tyres	81
Halogenated hydrocarbons	55
Paint waste/spray painting waste	20
Pickling acid	8
Batteries	4

Note: Some substances are counted in more than one stream

* : 1991.

Source: VROM, CBS.

The prevention and recycling targets for packaging, established in the Memorandum on the Prevention and Recycling of Waste, were:

- no increase in the amount of packaging generated;
- elimination of landfilling of packaging waste;
- an increase in recycling from an estimated 25 per cent of packaging in 1986 to 60 per cent in the year 2000; and
- qualitative waste reduction by removing hazardous materials (e.g. heavy metals, PVC) from the waste stream.

The Packaging Covenant, which was signed in 1991, sets the following goals for the year 2000:

- to reduce the total amount of packaging to the 1986 level and, if possible, strive for an additional 10 per cent reduction; and
- to promote re-usable packaging, with a target of 60 per cent recycling of disposable packaging, and prohibit packaging disposal in landfills.

In order to meet the goals of the Covenant, the Government and the Foundation on Packaging and the Environment (FPE), which represents relevant industrial sectors, agreed on a series of measures to ensure compliance with the adopted recycling targets. In turn, the packaging chain, i.e. the relevant private actors responsible for the production and distribution of packaging, agreed to develop recycling capacity in order to meet the targets as well as initiate projects for technology development in the areas of collection, sorting and recycling. The negotiated agreement was binding under private law (see Section 3 for details of the Packaging Covenant). However, early years of implementation of the agreement have proven difficult as “there is still a wide gap between the goals and present conditions.”⁵ Indeed, the total amount of packaging materials has increased by nearly 40 per cent from the 1986 level. The amount of packaging materials such as paper/cardboard, plastics and metal has increased except for glass, which fell by 2 per cent according to estimates made between 1986 and 1992. However, the recycling rate of packaging materials was nearly 37 per cent for household waste and 58 per cent for commercial waste during the same period, increasing from the 25 per cent of packaging material collected for recycling in 1986.

Nevertheless, annual reports produced by the Commission on Packaging and the Environment (CPE) appear to show that concerned industrial sectors have progressed in implementing different measures. Given the right conditions, the Covenant approach may therefore have been an effective instrument for promoting the internalisation of environmental considerations in products’ life-cycle. The Packaging Covenant has three underlying elements which made it relatively new, compared to preceding Covenants:

- the concept of “chain responsibility”;
- the use of the life-cycle analysis (LCA); and
- the use of the market economic analysis (MEA).

“Chain responsibility” means the responsibility for the environmental effects of production and consumption is *shared among the actors in the product chain*. In the case of the Packaging Covenant, packaging manufacturers, food producers and the Government share the responsibility for dealing with wastes arising from the use of packaging. This principle represents an important structural change in policy. Instead of a sole primary party, the principle extends the responsibility for the manufacturing of a certain product, or range of products, over the entire product life-cycle. In this way, the effects of costly adaptations can be shared among the companies that are involved directly or indirectly. In this way, it is expected that more efficient solutions may be encouraged, and isolated actions that might lead to considerable negative environmental as well as economic trade-offs prevented.

Thus, a chain management approach is likely to encourage more effective solutions through balanced distribution and co-ordination of the different issues to be dealt with among the different partners in the product life-cycle. Through the joint thinking process, a wider range of technical solutions may be generated and negotiated. This approach may be related to other management concepts which emerged at

⁵ *The Netherlands*, OECD Environmental Performance Reviews, Paris: OECD, 1995, p. 86.

the end of the 1980s, such as “trajectory management”. Trajectory management essentially refers to improvement of the efficiency of the production chain. The further development of so-called “Just in Time management” (JIT) – i.e. keeping inventories as low as possible and distribution networks as lean as possible – also fits in this trend. Through the involvement and co-operation of all partners in the chain, the implemented changes in the chain are kept as low-cost and efficient as possible. Conversely, partners in the chain may decide not to co-operate as a strategy to obtain a certain result. In that case, the chain is used as a strategy playing ground for competitive behaviour (de Hond, 1996). In other words, environmental results are being sought by giving the private sector a “free hand” to choose the optimal, most environmentally sound measures to make product changes and manage wastes.

The second, related principle is the application of the life-cycle analysis (LCA) in decision-making to ensure that all environmental effects of the production and consumption of a product over its entire life-cycle will be assessed. This principle is a key instrument for achieving waste minimisation targets included in the Packaging Covenant. The use of LCA also implies that selected options for preventing and/or reducing waste generation and impacts would not cause subsequent environmental problems in other phases of the life-cycle of a product (either upstream or downstream). Among the stakeholders, it was considered much more important to reach consensus on the most desirable outcomes from LCA than to define “objective” criteria for its use.

Considering the above definitions, these principles are closely connected. All the different parties involved in the production and distribution of a product are connected at some stage in its life-cycle. Together, these principles provide the focus in the Covenant to address both upstream (e.g. redesign, substitution) and downstream (e.g. re-use, recycling) issues when designing the optimal and most environmentally sound solutions.

Finally, the third new element is referred to as market economic analysis (MEA). According to this instrument, the different alternatives resulting from LCAs for a product are to be judged on economic grounds in order to assess the business-economic effects on the different parts of the chain. The starting point is that the selection of environmentally friendlier alternatives should not lead to a negative cost-benefit ratio, nor should the economic burden be borne by a single part of the product chain. Thus, through checking the market effects of LCA alternatives throughout all parts of the packaging chain (packaging producers, fillers, retailers/importers), this type of analysis should help identify the most cost-effective alternative for environmentally sound packaging materials and management of packaging wastes.

3. THE PACKAGING COVENANT

The Packaging Covenant, signed on 6 June 1991, is the outcome of intensive discussions between the private and public sectors. Consequently, the Government established a data base on the generation and management of packaging waste and then invited the main actors, representing different packaging materials, to participate in the development of an implementation strategy. The role of these networks was to collect and diffuse information about environmental problems of packaging waste, in order to discuss suitable policy options and the most appropriate means of implementation.

The following subsections describe the parties who took part in the negotiations leading to the Covenant, and provide details of the Covenant structure.¹

3.1 Parties

Besides the Dutch Government, the Covenant was signed by the Foundation on Packaging and the Environment (FPE), which represents different corporations including packaging manufacturers, packaging fillers, and waste managers. Although companies voluntarily sign up to the collectively negotiated objectives included in the Packaging Covenant, they are then legally bound by its conditions. If these are not met, they would be enforceable under civil law. Moreover, particularly for those companies that did not sign the Covenant, the “threat” of regulation has been “maintained” in case individual corporations do not undertake sufficient actions.² With respect to the take-back aspect of the existing Covenant, this has been mainly arranged through existing channels. For glass, PET, cardboard, paper, etc., these channels were already functional under municipal structures and through corporations by means of deposits on bottles and tray packaging.

The negotiations preceding the conclusion of the Packaging Covenant included the main actors from both the private and public sectors who had an interest in the use of packaging materials. The main actors participating directly or indirectly were:

- the **Ministry of Housing, Physical Planning and the Environment (VROM)**, one of the guiding parties in the Packaging Covenant, also representing the Ministries of Economic Affairs and Agriculture. The Ministry started promoting the use of Covenants at the end of the 1980s by initiating discussions with relevant target groups and sectors. From the outset, packaging and packaging waste were one of the first priorities to be addressed;
- the **Foundation on Packaging and the Environment (FPE)**, which represents the large majority of the market in the Netherlands for packaging and food products. This foundation,

¹ Appendix 1 provides the definitions for concepts and abbreviations used in the Packaging Covenant.

² As mentioned previously, the obligation to implement the provisions of the EC Directive on Packaging and Packaging Wastes has resulted in the adoption of mandatory recycling targets, thereby binding individual companies.

which has been in operation since 1971, was set up by industry in order to address the requirements of the EC Directive on the recycling of glass. Since the end of the 1980s it has participated in the preparation of the Packaging Covenant, since it is still the main industrial association with respect to packaging. It represents about 250 companies, including most large companies, that are involved in or have an interest in placing packaging on the market, either by supplying raw materials for packaging materials, by manufacturing and/or using packaging, by putting packaged products on the market, or by recycling packaging. Moreover, considering its membership and its role with respect to packaging and packaging wastes, FPE may be considered a Producer Responsibility Organisation (PRO) since it organises and supports members to achieve collective goals; and

- **consumer organisations and environmental NGOs**, which were involved in the peer review process of the life-cycle analysis (LCA) and associated market economic analysis (MEA) but were not undersigning parties to the Covenant.

The ministries were not physically present at the negotiations, but were involved:

- the **Ministry of Agriculture**, which was very concerned that large amounts of packaging were needed for agricultural products, such as foils for foods and products. It therefore represented one of the most important economic interest groups in the Netherlands and had considerable interest in potential changes associated with packaging; and
- the **Ministry of Economic Affairs**, which, dealing with industry and technology policy, was considered one of the key actors with respect to its relations with industry. It was also one of the main actors with respect to the integration of environmental aspects into economic policy.

The results of studies on packaging and packaging wastes have contributed effectively to the discussions (more than 270 sessions were held³) involving all of the stakeholders. These studies were conducted by the concerned corporations, the FPE, and private consultants.

3.2 Objectives

The text of the Covenant reaffirms some of the general goals of the 1988 Memorandum on the Prevention and Recycling of Waste regarding the avoidance, re-use and recycling of packaging and packaging waste. Some of the most important general goals will be discussed in the following sections. All goals are described more comprehensively in Appendix 2. Among the general objectives that were already contained in the 1988 Memorandum are:

- no increase in the amount of packaging generated;
- elimination of landfilling for packaging waste; and
- qualitative waste reduction by substituting hazardous compounds with more environmentally benign materials.

³ Personal communication with M. Haverland, Paris, August 1997.

In addition, the Packaging Covenant reinforced some of the general objectives of the Memorandum and introduced additional goals:

- to substitute hazardous packaging materials with less hazardous materials by the year 2000. Beyond 2000, packaging should not contain any hazardous substances, e.g. heavy metals;
- to reduce the total amount of packaging at least to the 1986 level, and to attempt a further 10 per cent reduction; and
- to promote re-usable packaging, as well as meeting the 60 per cent recycling target for disposable packaging.

Notwithstanding the specified targets of the Covenant, participants agreed to strive for additional targets for specific materials, to be reached by the end of 1995. These included recycling targets of 80 per cent for glass and 60 per cent for paper and cardboard. The extent to which these goals have been attained by the packaging chain is further discussed in subsection 4.1.

3.3 Monitoring of compliance

The Covenant includes provisions regarding the setting up of a monitoring system in order to follow the implementation of the specified targets. Individual members of the Foundation on Packaging and the Environment, and FPE itself, are responsible for initiating actions to ensure compliance with the collective goals set in the Covenant. FPE members must report their actions on an annual basis to the FPE Bureau. Also, the FPE must produce an annual action report on the measures the different actors within the packaging chain (retail, packaging producers) have taken to implement the conditions of the Covenant. The Bureau compiles the reports and provides the **Committee on Packaging and the Environment (CPE)**, an independent organisation created by the Covenant, with a comprehensive report on compliance with the Covenant's targets. Annual reports were published in 1992, 1993, 1994 and 1995.

The CPE is composed of five members, two nominated by the Environment Minister and two by the FPE. The parties that undersigned the Covenant jointly appoint an independent chairman. The CPE is responsible for assessing whether the terms of the Covenant are being complied with. It draws up its own internal code of practice regarding the work to be carried out. The main practical task of the CPE is to annually assess the reports drawn up by the FPE, in order to achieve the objectives laid down in the Covenant. The CPE, on the basis of the report of the FPE and its own assessment, will submit a report annually to the parties involved regarding both the results and the forthcoming tasks. Finally, the CPE will produce an annual report assessing the overall extent of achievement of the Covenant.

Besides evaluating the actions of companies, the implementation phases of the Covenant are measured using both input and output data. Input data covers the amount of new packaging introduced into the market (including wastes from exported products). Output data provides the amount of packaging processed as waste (including waste from imported products, or imported packaging wastes). An independent consultant is mandated to measure the input data, while the National Institute of Public Health and Environment (RIVM) is in charge of estimating the output data.

It has been difficult to obtain consistent data on input and output streams for 1986-1995. Definitions and measurement methods have changed during this period, which explains why RIVM and the independent consultant have not been able to produce consistent and comparable trends. For example, the consultant estimated an 18 per cent increase in the input of new packaging from 1986 to 1992, while

RIVM estimated an increase of 51 per cent for the same period. The differences between the input and output estimations can be attributed to the different types of data and sources from which both responsible monitoring parties obtain their information. The consultant makes an estimation largely based on data generated by the industrial organisations and companies involved, while RIVM obtains its data from the Ministry of the Environment and different municipalities. In addition, the 1986 data on waste generation is not as detailed and complete as that for the 1990s. The solution to this problem has been to use a “safety margin” or “range” to facilitate comparison of the 1986 data with more detailed subsequent data.

Another problematic aspect concerns the inclusion of data on exported and imported materials. To measure the input, corporations’ own estimates of export are used. In addition, the companies’ inventory systems have been checked through on-site visits. These have been carried out to ensure that the export of packaging material with exported products has been taken into account.

3.4 The use of LCA and MEA in the decision-making process

The reason for using both LCA and MEA as guidelines for implementing the Covenant’s targets was to give due consideration to the environmental and economic impacts of packaging materials and packaging wastes, including costs of collection and handling, recyclability, energy recoverability, etc. Moreover, given the predominant voluntary approach in the Netherlands, the use of these instruments provided the underlying principle for giving market forces the flexibility to determine the most suitable and environmentally sound option for the use of packaging.

Nevertheless, it was realised that these instruments entail many subjective interpretations and much scientific uncertainty regarding impacts and preferable types of packaging. In order to facilitate further discussions, a standardised method of using LCA and MEA in the decision-making process was developed in 1991 (R.J. in ‘t Veld et al., 1992). By using LCA, all environmental effects which could possibly be estimated for the manufacturing, use and disposal of the different products were identified. The details of observations and criteria for LCA are listed in Appendix 3. Results of LCA concerning the different alternative routes for several types of packaging can then be re-examined using MEA, i.e. cost-benefit estimations of the potential market-economic effects on the product chain (that is, on manufacturers, fillers, and retailers). The detailed parameters for the MEA are also listed in Appendix 3.

MEA provides the market-economic effects for different parts of a product chain, as well as estimations regarding the number of jobs that would be created, or lost, depending on each alternative. If properly completed, MEA should allow comparison of different scenarios with respect to their cost-effectiveness.

Setting up a standardised procedure and carrying out LCA and MEA for the product groups took 18 months longer than originally expected. This delay was attributed to the complexity of the process, the time needed for peer review, and competitiveness issues involving different industry stakeholders. As the main competitors were involved in the negotiations, the exchange of information regarding the development or alterations of products was a sensitive and difficult issue. It was finally solved by a declaration of secrecy, signed by all the parties involved.

An important aspect of the assessment of different alternatives under review was to ensure their comparability. In this regard, three elements should be carefully considered for each product under review:

1. the packaging system to be analysed;

2. the volume that is to be analysed; and
3. the number of prototypes to be examined.

If the above elements are properly identified, use of LCA will allow a good cross-comparison of the different alternatives. An important consideration, however, is the preliminary weighing of the ecological and economic aspects of the packaging systems. After the analysis is rounded off, the ecological and economic implications of different packaging alternatives can be judged. This will involve a considerable process of review, referred to as the “peer review process”. In executing LCA, followed by MEA, the following standard procedures and principles are usually followed:

i) Substantial input by concerned interests and experts

The premise here is that the involvement of the main actors is directly proportional to the quality of the final report. By allowing these actors to influence the process, the final outcome may benefit from wider support, thereby ensuring that the solutions will be more rigorously implemented.

ii) Centralisation and decentralisation of the decision-making process

The process is partly centralised, and partly decentralised. The organisation is designed to obtain the maximum degree of credibility and legitimacy. Product groups are categorised. For each of these product groups, separate group discussions are organised. These product groups are each in charge of carrying out LCAs and the associated MEAs.

The work of the project team is overseen by a steering group composed of representatives of industry, government and academia. This steering group holds regular meetings in which the progress of LCA and MEA for product groups is reviewed and discussed. The steering group is a central element in the process.

Before each individual project group starts its work, some basic assumptions are decided upon by the project group. The project groups then perform the LCA and MEA. This work is also regularly checked by an independent Scientific Council, which is in charge of safeguarding the quality of the LCA and MEA. The procedure works as follows:

1. Formation of a project team

Project teams are created for each separate product category. The decisions of these groups are reported to the steering group. In order to avoid as many biases as possible in the conduct of LCAs, representatives from the different parties are included in the steering group.

2. Checks and balances

LCAs and MEAs are undertaken by several project groups consisting of representatives of consultants, corporations, and NGOs. This work is managed by the steering group. Another review group is then responsible for overlooking the organisation and scope of the work. In total, nine product groups for conducting LCAs and MEAs were identified. LCAs were conducted for product categories except in the case of “paint” and “eggs”, for which EC Directives were already in place.

3. Review of reports

Once completed, LCAs and MEAs of product groups are reviewed by other committees (which exclude representatives directly involved in the company or production line associated with a product under review) and adapted. Then the Scientific Council, consisting of academia and NGO representatives, reviews and comments on the studies.

4. Choice

The project group is allowed to initiate the discussions on the conclusions of the LCAs and MEAs. Then the steering groups have the final word. A number of additional matters may be considered such as free riders, the build-up of product and material re-use systems, deadlines for adaptation, the need for supporting policy actions, etc.

The procedures described above are relatively lengthy and include a certain degree of complexity in assessing the results of the different alternate routes. First, the Scientific Council must perform a comparison of the information produced by the LCAs and MEAs. For each packaging system, both a qualitative and quantitative judgement are provided. Important aspects include:

- optimal phasing of proposed organisational changes;
- the technical changes planned;
- the financial consequences for the consumer;
- the consequences for employment per research unit in the chain; and
- other considerations pertaining to the use of packaging for the product under review.

The assessment of the reduction of ecological damage achieved using different alternatives must cover several items, particularly with respect to:

- scarcity of resources;
- consequences for public health;
- energy use;
- the level of emissions to air, water and soil resulting from use of the different alternatives; and
- the amount and quality of wastes generated.

Finally, upon the advice of the project groups and after further inquiry and discussion involving the Scientific Council, the steering groups select what appear to be the most appropriate and environmentally sound alternatives.

3.5 Impacts of the EC Packaging Directive

The approval and implementation of the EC Directive on Packaging and Packaging Waste (94/62/EC) somewhat impaired implementation of the 1991 Dutch Packaging Covenant. The EC Directive had two major consequences on Dutch packaging policy. First, it compelled the Government to introduce legally binding regulations. Second, the process of translating the Directive into the national context involved much discussion and negotiation between different ministries, most notably the Ministry of the Environment (VROM) and the Ministry of Economic Affairs (EZ), thus disturbing the implementation of the Covenant.

The Directive, in contrast to the Packaging Covenant, does not set clear goals for quantitative pollution prevention (such as the reduction of the total quantity of packaging in kilotonnes to the base level of 1986). Instead, it generally states that the amount of packaging should be minimised. The targets set in the Dutch 1991 Covenant for product and material re-use are stricter and must be implemented earlier, compared with the provisions of the EC Directive (reduction goals are to be reached by 1995, compared with the deadline of 2001 set in the Directive). The Dutch Covenant sets a re-use goal of 40 per cent, to be achieved by 1995. The EC Directive sets minimum and maximum recycling rates ranging from 15 per cent to 65 per cent for different types of packaging materials, to be attained by 2001. Furthermore, the EC Directive allows the use of heavy metals and ferrous components, a step-back from the provisions of the Dutch Packaging Covenant.⁴

However, the EC Directive allows Member States to go beyond its provisions under specified conditions. First, the recycling capacity should be sufficient to meet higher targets adopted by a particular Member State. Second, the measures taken should not lead to trade distortions of the internal market and should not cause problems for other Member States. Third, the stricter measures should not be used to pursue economic protectionism.

The Netherlands has adopted Ministerial Guidelines which aim at implementation of the EC Directive. At the time of writing, these Guidelines were in the final stage of approval. On several points, particularly regarding deadlines, the requirements are stricter than those of the Directive. In any case, the Dutch parties involved in the development of the 1991 Covenant have declared that they are still committed to comply with the original, stricter objectives of the Covenant. Negotiations for a new Covenant are currently underway. In this regard, various authors (Douwma, 1995, Hafkamp, 1995) have pointed out that the EC Directive may interfere with the favourable development which was already underway in the Netherlands.

In the new Dutch Covenant, more emphasis will be put on the role of municipalities with respect to re-use products and materials. Furthermore, more emphasis will be given to the responsibility of the producer. Important elements in the new Covenant also include requirements concerning the introduction of new products and recycling infrastructures. The producer of a new product will need to comply with the

⁴ Although no specific limits were set for heavy metals when the Directive was adopted, there is a provision which enables such limits to be set at a later stage.

requirement that at least 65 per cent of the waste be recovered before its product may be put on the market.⁵ At least 45 per cent of this recovery should be accomplished through recycling.

⁵ A. Dijkzeul, "Extended Producer Responsibility: as seen by the Ministry," paper presented at Green Goods 3, Oslo, 15-16 February 1996, p. 3.

4. ECONOMIC EFFICIENCY AND ENVIRONMENTAL EFFECTIVENESS

In this section, the available information on the achievements of the Covenant is reviewed and discussed using the four elements of the SIDE-model as an analytical framework. The model has been tuned to answer the specific questions of this case study. Four relevant elements have been identified for analysis:

- improvement of environmental quality from a life-cycle perspective;
- competitive fitness of industry;
- resource efficiency; and
- innovative improvements of products and processes.

The first element, *improvement of environmental quality from a life-cycle perspective*, focuses on how a reduction of environmental burden from a life-cycle perspective contributes to the overall improvement of environmental quality. This is assessed through the study of the reduction of waste generation.

The second element, *competitive fitness of industry*, concerns the likely effects of actions undertaken by corporations or organisations participating in the Covenant. This element has been analysed using data such as growth in overall productivity and in the sector under review.

The third element, *resource efficiency*, is connected to the market-economic implications of different alternatives for avoiding and/or reducing environmentally damaging effects. The resources expended on some solutions that reduce the environmental burden of one type of packaging may be more cost-effectively spent on another type of packaging or solution. This is examined by reviewing the results of LCAs and MEAs that were performed to assess the consequences of different alternatives for the existing range of products.

The fourth element, *innovative improvement of products and processes*, looks at the rationale for and the effects of innovation and improvements, triggered by the Covenant, on the development of products and processes. This element is studied by reviewing the reactions of individual corporations to the EPR scheme in question.

4.1 Improvement of environmental quality from a life-cycle perspective

Since 1991, the Commission on Packaging and the Environment has published annual reports reflecting the progress made by the industry that undersigned the Covenant. The available results are provided below.

With regard to the first, general goal of the Packaging Covenant, the amount of new packaging to be put onto the market should be reduced by 2000 below the level of the reference year 1986. This goal had almost been attained by 1995. However, notwithstanding the results of the Covenant, packaging

wastes are no longer allowed to be landfilled, but should be either incinerated with energy recovery or recycled (Ministry of Housing, Physical Planning and the Environment, 1996).

All recent initiatives (according to the 1994 report) aimed at reducing packaging and/or packaging waste involve preventive measures. Out of a total of 325 reported actions, 190 aimed at prevention. Examples include the avoidance of transport packaging, the reduction of foil packaging, and the substitution of disposable packaging with returnable packaging.¹

The data used to examine the results of the Covenant includes output estimations by the RIVM (National Institute of Public Health and the Environment), which indicate the amount of various types of waste. They are based on inventories of the industrial and household waste streams collected for treatment. The percentage of packaging materials in the waste stream is calculated through (yearly adapted) random sampling. This percentage is then multiplied by the total amount of measured industrial and household waste. Then the amount of packaging waste arising from the service and retail sectors is added to this figure in order to obtain approximately the total amount of packaging generated. **Table 3** shows the total amount of packaging wastes generated in the Netherlands in the period 1991-1994. **Tables 4, 5 and 6** further break down this amount by categories (i.e. household, industrial), as well as showing the amount generated by the service and retail sectors. In all cases imported wastes are taken into account, but items such as milk bottles are not included as they fall into the category of re-used products and are therefore not calculated as waste.

Table 3 - Total Amount of Packaging Generated in the Netherlands (1991-1994)

in kilotonnes

Material	Plastics	Paper/cardboard	Glass (disposable)	Ferrous metals	Aluminium	Total
Year						
1991	645	1 688	558	263	46	3 201
1992	647	1 658	523	325	49	3 202
1993	538	1 500	504	201	18	2 761
1994	613	1 415	463	189	19	2 699
Goals 1994	<645	<1 688	<558	<263	<46	<3 201

Source: National Institute of Public Health and the Environment, *Analyse Verpakkingsafval 1994*, report nr. 776201021, p. 8.

¹ However, Margaretha De Boer, the Dutch Minister for Housing, Physical Planning and the Environment, has officially informed the Stichting Verpakking Milieu (FPE) that, as of today, the Ministry sees no reason for a switch from one-way to returnable packaging systems. The statement follows the results of LCA and MEA analyses carried out for certain products in accordance with the requirements of the Packaging Covenant of 1991. See "No need for switch to returnables," *Alliance*, February 1996, Vol. VII, Issue 1.

Table 4 - Amount of Packaging Waste Generated by Households (1991-1994)

in kilotonnes

Materials	Plastics	Paper/cardboard	Glass (disposable)	Ferrous metals	Aluminium	Total
Year						
1991	308	381	517	110	18	1 334
1992	334	404	483	115	18	1 354
1993	268	419	481	100	11	1 279
1994	289	452	441	98	12	1 292

Source: National Institute of Public Health and the Environment, *Analyse Verpakkingsafval 1994*, report nr. 776201021, p. 8.

Table 5 - Amount of Packaging Waste Generated by Industry (1991-1994)

in kilotonnes

Materials	Plastics	Paper/cardboard	Glass (disposable)	Ferrous metals	Aluminium	Total
Year						
1991	104	423	16	78	9	631
1992	80	370	15	135	12	612
1993	69	287	6	49	3	414
1994	81	229	7	37	1	355

Source: National Institute of Public Health and the Environment, *Analyse Verpakkingsafval 1994*, report nr. 776201021, p. 29.

Table 6 - Amount of Packaging Generated by the Service and Retail Sectors (1991-1994)

in kilotonnes

Materials	Plastics	Paper/cardboard	Glass	Ferrous metals	Aluminium	Total
Year						
1991/1992	179	884	25	75	19	1 182
1993	147	794	17	52	4	1 014
1994	189	734	15	54	6	998

Source: National Institute of Public Health and the Environment, *Analyse Verpakkingsafval 1994*, report nr. 776201021, p. 29.

According to the estimates of the National Institute of Public Health and Environment, all of the targets set for packaging waste reduction in 1994 were met. All the goals for product and material re-use for specific waste streams were met, except for plastics. A pilot project revealed that product and material re-use of plastics is problematic and expensive. Studies on new technologies for plastics are underway.

According to the RIVM statistics, a closer look at the performance of the different waste generators shows that the relatively high decreases achieved in industrial sectors have been partly countered by increases in the service and retail sectors. Furthermore, with respect to the plastics waste stream, the service/retail and household sectors have been responsible for a steady increase in packaging materials. This can be partly explained by the fact that the service sector has grown considerably since the end of the 1980s.

In addition, prognostics for the future generation of packaging wastes appear to indicate that the goals of the Covenant will continue to be met in upcoming years. This assumption is based on estimations of the amount of new packaging being put on the market, based on the period 1986-1994. **Table 7** provides the figures for packaging waste generated, per types of material, in 1986-1994. However, the exception to this trend concerns again plastics. In addition, the goals to be set for product and material re-use

under the new Covenant are considered to be reachable, according to the municipalities. Ongoing discussions concern the problem of financing, i.e. whether the funding should be provided by industry or public authorities.

Table 7 - Packaging Waste Trends per Material Categories for the Period 1986-1994

in kilotonnes

Materials	Plastics	Paper/cardboard	Glass	Ferrous metals	Aluminium
Year					
1986	100	100	100	100	100
1991	123	122	99	113	108
1992	128	124	99	118	116
1993	129	120	97	110	104
1994	131	122	96	110	100
Goals 1994	<123	<122	<99	<113	<108

Source: Commissie Verpakking en Milieu, *Jaarverslag commissie verpakkingen*, October 1995, p. 26.

As mentioned previously, the above results show that the reduction goals set in the Covenant for 1994 have been mostly achieved, except for plastic packaging, which rose slightly above the 1994 interim goal.

It has proven difficult to draw extensive conclusions with regard to the influence of the LCA/MEA exercise on the final outcomes. Only a few alternatives, which were considered feasible, have been implemented. Many enterprises, however, have realised that there are opportunities for identifying “win-win” solutions through the use of such instruments. Thus, the use of LCA/MEA has helped identify hundreds of innovative packaging adaptations, including complete rethinking of the use of packaging or avoidance of transport packaging in certain cases (*Stichting Verpakking en Milieu*, 1992, 1993, 1994, 1995). Globally, results from these studies have encouraged private companies to redesign the production and use of packaging, for example by producing lighter materials and/or smaller packaging, and to use less composite materials. Most of these changes are listed and described in the annual report on “packaging developments” published by the FPE. However, no systematic study has been carried out that specifically assesses the total effects of these incremental changes. In any case, all of these initiatives have contributed to a reduction in the use of resources for producing packaging material in the Netherlands, as illustrated in Table 6.

There is one case where the complexity of applying LCAs and MEAs for cost-effective and environmentally sound decisions can be shown. LCAs and MEAs have been applied to milk packaging. Three main alternatives were compared: the glass bottle, the returnable polycarbonate bottle, and the plastic sachet. For the MEA, the micro- and meso-economic effects of the different alternatives throughout the whole chain were estimated (benefits and costs for the packaging producers, fillers and importers/retailers). According to both LCA and MEA analyses, the sachet appeared at first to be the most favourable alternative. Although the sachet was identified as the most viable alternative on the basis of economic considerations, it was not chosen since it appeared to cause considerable inconvenience to customers. Leaks were very possible, and on-the-shelf presentation might not be appealing. Finally, the reusable polycarbonate bottle was selected, as it was the second-best option in terms of environmental performance and costs appeared to be acceptable to actors in the milk-packaging chain.

4.2 Competitiveness of industry

The effects of the Packaging Covenant on the market have been debated in several fora. However, little market data is available. In order to give some indication of economic trends with regard to Dutch producers, some circumstantial economic evidence needs to be provided.

While the packaging waste stream has been reduced in accordance with the requirements of the Packaging Covenant, GDP grew annually from 1990 to 1996, on average by 2.8 per cent per year.² Quantitative information on market trends following the adoption of environmental measures under the Packaging Covenant is not available at the sectoral level. Also, individual companies have not been generous in providing information, since this is thought to be a key factor in competition. In order to obtain information on the market situation, several methods were explored. For asserting the position of the Dutch industry within the EU market, inefficient reliable data was available. Therefore, a more limited parameter of the competitiveness of the different sectors of the Dutch industry in the Dutch market was developed. This parameter better met the criteria of data reliability and validity. In spite of its limitations, it can provide some information on how the large corporations have been performing and competing with their foreign counterparts on the Dutch market.

According to the information available, the competitiveness of the Dutch industry neither increased nor decreased because of the packaging measures, while the competitiveness of the food production sector increased although it was closely involved in the Covenant. The available results regarding market trends may indicate that packaging overall only has a marginal role in terms of competitiveness. Packaging as such forms only a small part of the costs of a product, and therefore reduction in the use of packaging material results in most cases in only small reductions in production costs. These findings confirm earlier findings at the OECD Joint Session of Trade and Environment Experts (1995) that there is an absence of a causal connection between environmental standards and trade flows.

Trade aspects, i.e. disturbance of trade caused by the implementation of the Covenant, have not been identified. This may be explained by the fact that the goals set in the Covenant were mainly achieved using preventive measures. Besides fixed goals for prevention, re-use and recycling, no take-back obligation for individual companies or groups of companies was included. In this way, problems with individual companies that were importers, or that did not have the technical or financial capacity to comply with take-back requirements, were avoided.

In conclusion, the actors involved in the Covenant process have made various qualitative statements with respect to the Covenant's impact on competitiveness. Some representatives of companies considered that the Covenant neither improved nor worsened their situation. Others, however, recognised that their view of environmental issues had changed as a result of acquiring a better appreciation of environmental impacts on production costs and product development.

4.3 Resource efficiency

The measurement of environmental performance was one of the most important objectives to be reached using LCAs and MEAs. In many cases, trade-offs associated with a change to returnable packaging were considered expensive compared with the kilotonnes of waste which could have been

² Data derived from publication of the Central Statistical Office, 1994, p. 64.

avoided.³ Some general estimations propose cost increases of 10 to 50 per cent (in comparison with alternative or existing disposable packaging): with the cost of avoided waste at 5 000-20 000 DFL/tonne, only marginal environmental benefits were achieved. Considering that the management of waste is not expected to cost more than 1 000 DFL per tonne in 2010, the costs of implementing re-use or recycling systems were in some cases considered far too high⁴ with respect to the environmental benefits.

The “winner” alternative (on which consensus was reached among the different partners), in terms of environmental gains and reasonable market-economic implications, was generally a hybrid type of packaging, i.e. one composed of a returnable and non-returnable part such as softener packed in sachets with a hard re-usable cover. The other “winner” alternative was a lighter, disposable or returnable package.

4.4 Innovative improvements of products and processes

In order to reach the goals of the Covenant, various changes in products and processes were implemented. Two main types of innovations or improvements with respect to products can be distinguished:

- First, there have been incremental innovations concerning packaging which needs only minor modifications or partial elimination. Such initiatives have led not only to a decrease in the use of resources, but also to reduction of production costs. For example, several producers/importers of packaging have eliminated the cardboard box for individual tooth paste tubes; and
- Second, there have been more sophisticated innovations such as the introduction of hybrid packaging (composed of returnable and non-returnable parts), as well as new product designs. Based on the results of LCA and MEA analyses, a good deal of streamlining of packaging material (e.g. avoidance of use and reduction in weight) took place.

Although it can only be measured qualitatively, the most important innovation has to do with the combination of results from the LCAs and MEAs and subsequent discussions within corporations, resulting in a better idea of the allocation and statistical sensitivities of the costs pertaining to the environmental aspects of production. In addition, through the identification of alternative paths and their related costs, inputs have been provided for corporate R & D. The extent to which this has led to actual changes can be estimated only with great difficulty. No evaluation of the follow-up to the exercise has been provided so far.

³ Kilotonnes of avoided waste, expressed in terms of the costs of avoidance.

⁴ Data from W. Hafkamp, *Turbulentie en terugval: het moeizame veranderproces van economische groei naar duurzame ontwikkeling, inaugurale rede*, Rotterdam, 1996, pp 14.

5. CONCLUSIONS

In several policy documents and government-industry discussions, the activities carried out within the context of the Covenant were considered to be an important learning exercise for both governmental and industrial organisations (Hafkamp, 1996, Blonk, 1994, Bezem, 1995). First, better insight was gained regarding the main environmental impacts of certain products or processes; second, experiences had shown how these problems were dealt with from a corporate perspective. The exercise was considered very useful by industry representatives and sector organisations themselves, as it provided a better understanding of the cost structures of their production processes and products in terms of environmental impacts and energy efficiency. This has led to numerous innovations in the area of packaging, and savings in the amount of material and energy used for packaging purposes, as well as significant reductions in packaging wastes.

Not much is known about the exact benefits and costs related to implementation of the Covenant. Consumer prices changed only marginally. Reductions in material use have somewhat lowered transport and packaging costs.

The following sections summarise the main findings and describe areas where improvements might be advisable. Reference is made to recent developments with regard to the new Covenant.

5.1 Satisfaction of actors

Most of the participating parties in the Packaging Covenant interviewed during the case study expressed their satisfaction with the process and related results. The actors less satisfied include environmental NGOs, which did not consider that all possibilities for re-use had been adequately considered.

Elements of the Dutch Packaging Covenant which may be useful for other OECD Member countries include:

- the use of planning requirements (LCA, MEA), in addition to quantitative goals for prevention and the re-use of products and materials;
- the involvement of the main players in the product chain;
- the coupling of product and waste policies; and
- the establishment of a monitoring system.

Besides quantitative goals for product and material re-use, planning requirements were set in the Covenant, for example in creating an obligation to plan for substitution of environmentally damaging packaging composites by environmentally more benign materials. The most important planning requirement has been the studies using both LCAs and MEAs by corporate representatives, independent

experts, consultants and researchers. All parties involved in this exercise were positive about the insights they gained. By considering different alternatives, they identify the environmental burden and the main costs at all phases of the product's life-cycle. Furthermore, these methods provided a learning experience for the producers by making them more aware of business opportunities. Also, the use of LCAs and MEAs facilitated more balanced decision-making regarding the environmental and economic impacts of alternatives. This turned out to be particularly useful, as the conventional wisdom regarding the environmental benefits and costs of certain pathways changed following the application of LCAs and MEAs.

The collaborative effort of the FPE, CPE and Ministry of the Environment has created broad support for the implementation of the Packaging Covenant in the different sectors involved. Involvement of the main stakeholders in the Covenant's deliberation, implementation and monitoring phases favoured a co-operative atmosphere and the avoidance of conflicts in the implementation phases.

Regarding the influence of the monitoring systems, the annual reports have fulfilled an important function by providing a clear view of the effects of the implemented measures and focusing attention on possible drawbacks. In addition, the incorporation of data on imported and exported packaging increased considerably the credibility and transparency of the entire exercise.

5.2 Elements for improvement

Based on experiences to date concerning the Packaging Covenant, the following areas can be identified for possible improvement:

1. Increased involvement of consumer organisations

A more intense involvement of consumer organisations in negotiating schemes seems essential in order to take full advantage of an environmentally well informed market. Beyond representing the interests of the consumer as a stakeholder, consumer organisations should be particularly focused on the role of education as an important tool for waste minimisation.

2. Better monitoring of transfrontier movements of packaging wastes

Although the Covenant's measurement and monitoring system functioned satisfactorily, there are no comprehensive monitoring systems for transfrontier movements of packaging wastes. The current system is satisfactory for ensuring that domestic goals are complied with, but a more comprehensive system for the monitoring of such wastes is essential for proper evaluation of whether packaging wastes are also reduced from an international perspective. In fact, the system for evaluating packaging policies should take transfrontier movements into account and judge the effectiveness and efficiency of a system from an international perspective and not only from a national one.

3. Better engagement of consumers in the procedure

In various cases, the measures that producers took to reduce the amount of packaging led to reductions in production costs. These reductions in production costs did not usually result in price reductions for consumers. “Win-win” solutions can be translated into consumer price reductions. Such an initiative could have a positive impetus on consumer attitude and behaviour towards environmental protection, as well as the further marketing of environmentally sound products.

4. Better interaction of Covenant and other environmental policy instruments

Several studies demonstrate that, with respect to process-related Covenants, effectiveness and efficiency increase when a tight connection is established between the Covenant and the environmental permit or corporate environmental plan. It is hypothesised that this might also be the case for product-related Covenants. It would be useful to explore this issue further.

In addition to the improvements suggested above, a key problem has been that not all corporations in the packaging chain undersigned the original Covenant, creating a free-rider problem. In order to implement the EC Directive, a new Covenant will update the old one. The major divergent views among the actors currently concern: (1) the setting of new goals for quantitative prevention, and (2) how to set goals for the re-use and recycling of plastics packaging. As of mid-December 1996, the latest information is that the companies not undersigning the new Covenant will fall under the regulatory regime of the Ministerial Guidelines that implement the EC Packaging Directive. There will be an umbrella Covenant, and for different “chains” associated with different types of packaging materials there will be specific “material” Covenants. In general, the Guidelines reflect an increased emphasis on setting up formal structures for product and material re-use.

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APPENDIX 1 – GLOSSARY

Frequently used abbreviations:

<i>CPE</i>	Commission on Packaging and the Environment
<i>EU</i>	European Union
<i>EC</i>	European Community
<i>FPE</i>	Foundation on Packaging and the Environment
<i>LCA</i>	Life-cycle Analysis
<i>MEA</i>	Market Economic Analysis
<i>RIVM</i>	Netherlands National Institute for Public Health and the Environment
<i>VROM</i>	Netherlands Ministry for Housing, Physical Planning and the Environment

Definition of concepts in the Packaging Covenant:

Packaging chain: branch organisations and individual companies working with the FPE, and which have an interest in putting packaging on the market in the Netherlands,

- either by supplying raw materials for packaging materials;
- by manufacturing packaging;
- by using that packaging;
- by putting packaged products on the market; and/or
- by recycling packaging.

Packaging industry: that part of the packaging chain which is not engaged in the supply of raw materials to manufacturer of packaging, nor with the recycling of used packaging.

Packaging: the end product of the packaging industry, destined for the packaging of products or goods.

Re-usable packaging: packaging which is being used several times for the same purpose.

One-way packaging: packaging which is not being used more than once for the same purpose (=disposable packaging).

Multiple packaging: packaging which encloses already packaged products.

Additional packaging: packaging which is added by the (distributive) trade to a product which is packaged.

New packaging to be put on the market: packaging used for the first time for the packaging purposes.

Used packaging: packaging which is left over once the product has been unpacked.

Packaging materials: the raw materials or (semi-) finished goods used in the manufacture of packaging.

Quantitative prevention: measures for the reduction of the volume of packaging/packaging materials.

Qualitative prevention: the prevention and reduction at source of environmentally harmful materials/substances.

Product re-use: the use of used packaging as such for the same purpose, or for alternative purposes.

Material re-use: the use of the materials from used packaging for the same purpose, or for alternative purposes (=recycling).

Reprocessing: the processing of used packaging, which is not suitable for product re-use into other products or raw materials, as well as the use of that raw material in production processes.

High grade reprocessing: reprocessing of used packaging in such a way that the resulting raw material is comparable in quality terms to the raw material used for the manufacture of the original packaging.

APPENDIX 2 – DETAILED GOALS SPECIFIED IN THE 1991 DUTCH PACKAGING COVENANT

The general goal of the Covenant was transferred into more specific goals regarding quantitative and qualitative prevention, product re-use and material re-use, as follows:

Quantitative prevention

Specific goals were set for the reduction of new packaging entering the environment. They include:

- a) The packaging chain obliges itself to reduce the amount of new packaging to be introduced in the market by the year 2000 under the level of the reference year 1986;
- b) The packaging chain should do its best to reduce the amount of new packaging put on the market to a maximum of 90 per cent of the quantity of that kind of packaging in the reference year 1986;
- c) The packaging chain obliges itself to reduce the amount of packaging to be introduced in the market in 1997 with minimally 3 per cent under the level of 1991;
- d) The packaging chain obliges itself to do as much as possible to bring the amount of new packaging to be introduced in the market in the year 1994, to the same level as the amount of packaging introduced in the market in 1991. Additionally, the amount of packaging to be introduced in the market in 1997, should be reduced to at least 10 per cent below the level introduced in the market in 1991.

Additionally, measures are specified that should be taken into account to attain these goals. They include:

1. The development and application of new packaging concepts, optionally in relation with the product form;
2. The development of technologies that will enable the use of lighter and stronger materials;
3. The development and marketing of material-efficient packaging;
4. The avoidance of superfluous packaging material;
5. The elimination of added and multiple packaging; and
6. The implementation of specified pilot projects regarding packaging within one year.

Qualitative prevention

This category includes in particular aspects regarding the reduction of the environmental impact of packaging. Its main goal is to use, as soon as possible, substances and materials for packaging that minimise environmental impact, but not later than the year 2000.

Measures for pursuing this goal include:

- a) The replacement of environmentally damaging additives in packaging or packaging materials with those that are the least damaging to the environment;
- b) The substitution of colorants which contain heavy metals by alternatives which do not contain these substances;
- c) The transfer to water-based or low solvent paints, as agreed within the Covenant on Volatile Organic Compounds 2000;

- d) The banning of the use of lead tops on bottles;
- e) The replacement of materials and material combinations in applications that cannot be recycled, by alternatives which can be recycled;
- f) The re-use of environmentally friendly-design packaging;
- g) The avoidance of packaging materials which impede recycling;
- h) The reduction of the diversity of disposable packaging to a low diversity of packaging materials that can lead to high-quality recycling through collection; and
- i) The set-up of programmes for the more efficient use of energy, particularly vis-à-vis material types, which consume relatively high quantities of energy.

When in addition, it is shown that other measures will work more efficiently, the replacement of one or more of the mentioned measures can be made by the packaging chain.

Product Re-use

When research shows that the replacement of one time disposable packaging clearly causes less damage to the environment and there are no market-economic objections, the packaging industry obliges itself to alternate to the use of multiple-use packaging, diminishing the use of one time used packaging.

Measures taken in order to reach these goals include:

1. The implementation of environmental analyses by independent institutes, to be nominated by the parties of the packaging chain;
2. The different environmental analyses for specified products will be implemented by 1 December 1992;
3. The results of these environmental analyses will be reported to the Commission on Packaging and the Environment. This will be done not later than three months after the finalisation of these environmental analyses; and
4. In any case, within one year of the signing of the Covenant, several specified actions in this area are to be taken.

Material Re-use

This goal category regards the use of packaging waste as a raw material resource.

The packaging chain obliges itself to do high quality recycling of, at least, 60 per cent of the used packaging that is not used for product re-use

The packaging chain additionally obliges itself to re-use the material of, at least, 40 per cent of the used amount of packaging that is not feasible for product re-use, before 1995.

The packaging chain obliges itself to perform high-quality recycling of at least 50 per cent of the used packaging that cannot be used for product re-use before 31 December 1995.

In this perspective, the packaging chain strives for the following results:

- a) 80 per cent recycling of one-time used glass;
- b) 60 per cent recycling of dry paper/cardboard packaging;
- c) 50 per cent recycling of all bottles and containers of high-quality plastics, as well as 50 per cent of the packaging foil from the office and service sector; and
- d) 75 per cent recycling of metal-composites of packaging.

Overall, the packaging chain obliges itself to take back minimally 90 per cent of the used packaging in the year 2000, unless this packaging cannot be used for product re-use and is collected separately.

APPENDIX 3 – PARAMETERS OF LIFE-CYCLE ANALYSIS (LCA) AND MARKET ECONOMIC ANALYSIS (MEA)

(1) Important aspects with respect to the LCAs include :

A. The relationship between packaging systems and the environment

Components for assessing relationship between packaging system and the environment for LCA are presented in the table below.

Components incorporated in the LCA

Perspectives	Environmental aspects	Resource extraction	Production of materials	Manufacturing products	Use of the product	Waste Treatment
Raw resources	<ul style="list-style-type: none"> • Exhaustion of scarce resources • Exhaustion of non-renewable materials • Degradation of physical environment 					
Energy	<ul style="list-style-type: none"> • Exhaustion of non-renewable energy sources • Total energy used 					
Emissions through -Air -Water -Soil	<ul style="list-style-type: none"> • Emissions acidification • Emissions manure material • Emissions greenhouse gases • Emissions ozone layer damaging gases • Emissions toxic substances • Emissions waste-warmth • Radiation 					
Waste	<ul style="list-style-type: none"> • Volume waste prior to treatment • Volume final waste • Volume chemical wastes 					
Hindrance	<ul style="list-style-type: none"> • Spreading of smell • Noise hindrance for user/environment 					
External safety						
General quality, incl. public health						

B. Way of reporting

It is important to note that the way of reporting is essential in order to deal with the results of the LCA. Requirements include :

- operationalisation per component;
- a relative comparison between packaging systems per component ;
- a relative comparisons between components per packaging systems ;
- a description of the values for the intensity of differences; and
- a description of the way that methodologies were followed and data was gathered

(2) Important aspects with respect to the MEA include :

A. The costs and benefits of changeovers from the current to possible alternative modes of production is the focus of the MEAs

B. Components

The components are categorised from the MEA in a technical and a non-technical part. With respect to the *technical part*, this means that it should be investigated whether :

1. A packaging system is technically possible and within what time frame;
2. A packaging system is possible on the desired scale ; and
3. The new system is reliable and over what time frame it will be reliable.

With respect to the *business-economic parts*, the following aspects need to be considered :

- The corporate result and the number of labour places in the existing enterprises :
 - *Marketing aspects;*
 - *Health aspects; and*
 - *Safety and the labour effects on :*
 - suppliers;
 - enterprises involved; and
 - clients.

- *Influence on future production :*
 - relative competition position (international composition) ;
 - suppliers; and
 - enterprises involved.

New groups of corporations

It is important to take into account who are the potential winners. New corporations can emerge that profit from the new situation (e.g. the recycling industry). The number of new labour positions needs to be estimated.

Consumers

With respect to the consumer, it is important to check what are the consequences for the buying power and buying behaviour of shifts in the packaging system/volume. Explicit attention is to be paid to the using time that consumers need.

How the interdependent relations between enterprises are affected should be also assessed. With respect to the aspect of *corporate earnings* attention should be given to :

1. Assessment of effects on market share through marketing studies.
2. Estimation of the diverse components of the costs that require further specification. This operationalisation in turnover and cost components offers the possibilities to consider all mentioned factors. The project groups decide which elements of the chain are to be studied more closely. **Three alternatives** are possible:
 - a) Individual enterprises;
 - b) Clusters of corporations with a comparable production process; and
 - c) The sector as a whole.

At least, *two of the three following* considerations should play a role :

- the number of companies within a product group ;
- the heterogeneity of the production process within the companies involved; and
- the heterogeneity of the production processes within the corporations concerned .

C. Way of reporting

Important elements in the reporting process with respect to the relationship between steering group and projects groups and the reporting include:

- Information input of the steering group and project groups (both demanded and undemanded);
- Sources: the use of non-verifiable sources is not possible;
- Confidentiality: the information given to the research institutes/project groups is confidential and there will be only exchange of this information between steering group, scientific council, the project group working on a specific issue, and the research institute or consultancy involved; and
- All the participants involved will be obliged to undersign a declaration of secrecy. In this way, the competition issue will be covered.

APPENDIX 4 – AN EXAMPLE OF THE MARKET ECONOMIC ANALYSIS

Summarised example, market economic consequences for three alternatives to cardboard packaging for milk (after peer review process).

Price Changes in DFL as consequence of different alternatives to cardboard packaging

- Glass Bottle : + 19 Cents per litre
- Polycarbonate Bottle : + 16.5 Cents per litre
- Sachet : 6 Cents per litre

The glass bottle and polycarbonate bottle are re-use options, the sachet is a disposable package

These price changes are the consequence of the following structural changes which need to be implemented for changes in the way of packaging. The checklist of potential costs/benefits includes:

- Changes for packaging producer/filler
- Transport
- Retailers
- Important sensitivities

The following sections briefly explain the type of changes.

1. Changes for packaging producer/filler

The costs of changes for the producer include costs related to:

- the costs of the packaging itself;
- the changeover to different materials/types of packaging (capital costs);
- wage costs that need to be adapted as consequence of the new packaging (variable costs).

For the different alternatives, these changes have the following consequences:

- Glass Bottle 45 Cents
- PC Bottle 67 Cents
- PE Sachet -68 Cents

2. Changes pertaining to transport

This category includes the changes in:

- personnel costs, due to changes in the number of “rides”;
- the number of litres of fuel used per ride (dependant on the weight);
- the number of rides per 1000 litres of milk (might include changes due to the difference in space that packaging costs).

The price changes include:

- Glass bottle + 19
- PC bottle + 6
- PE sachet - 1

3. Changes pertaining to the retail sector

Consequences for this responsible part of the chain include:

- Costs/benefits due to changes in the amount of space used for packaging (capital costs); and
- Costs/benefits due to changes in handling practices (both variable-waste costs as well as fixed costs changes in installations e.g. for cleaning).

Estimated changes in costs for the retailer included:

- Glass bottle + 65
- PC bottle + 49
- PE sachet - 2

For the glass bottle:

- Glass has an environmentally-friendly image, but is heavy and breakable.

For the PC bottle:

- Consumers have a negative perception of plastics; and
- Experts have doubts of the degree to which PC bottles can be cleaned properly.

For the sachet:

- Although in the calculations it comes out advantageously, there are considerable disadvantages to this type of packaging, which include amongst others, its vulnerability to pointed objects, inconvenience for the clients.

In combining the results of the MEA with the LCA the re-usable polycarbonate bottle was in the end the packaging that came out as a “winner”, broadly supported by the majority of the participants involved.