IIIEE Master's Theses 2005:08

Extended Producer Responsibility and Local Government

Exploring Municipal Roles in Managing Packaging and Paper Wastes

Gregory J. Tyson

Supervisors

Naoko Tojo

Chris van Rossem

Thesis for the fulfilment of the
Master of Science in Environmental Management and Policy
Lund, Sweden, October 2005

Published in 2005 by IIIEE, Lund University, P.O. Box 196, S-221 00 LUND, Sweden,
Tel: +46 – 46 222 02 00, Fax: +46 – 46 222 02 10, e-mail: iiiee@iiiee.lu.se.

ISSN 1401-9191

Acknowledgements

To start I would like to thank the IIIEE for generously admitting me to the MSc program as well as thank all the members of Batch 10 for a memorable year. Also I would like to thank the staff at the institute for always being available to handle administrative problems and issues for the students. In particular I want to thank Lars Hansson for his always cheerful and friendly conversations. I really do need to mention Mikael Backman as well for his great introduction to the fascinating field of sustainable tourism and for the absolutely fantastic and unforgettable time we all had in Åre during the SED exercise this past April.

Special thanks are definitely due to Thomas Lindhqvist for his always stimulating lectures on environmental product policy and EPR. Also Naoko Tojo and Chris van Rossem for their generosity with their time in supervising this thesis and always constructive comments and support. You were both extremely helpful and contributed much more than you might think, thank you.

For their generous financial support during the thesis period, I want to thank the Lions Club International which made it possible to travel around Sweden to undertake this thesis. Thanks are also due to the busy municipal officials for their time and for sharing their knowledge and views about the fascinating Swedish waste situation. Your stories were really interesting.

I also want to mention my parents who always supported me no matter where I chose to go. Lastly, and most importantly I want to thank my wife Eva for her truly unending support over this very busy 14 months and especially during the stressful thesis period. I know I drove everybody in our house crazy, especially these last few frantic weeks. Finally, for preventing me from getting too carried away with my work I want to thank my two children Helena and Ben for dragging me from my desk for their frequent reminders about the really important things in life.

Abstract

This thesis profiles the experience of four municipalities under Swedish Extended Producer (EPR) systems for newsprint and packaging. Rationales behind a role for local governments and the experience of the municipalities are explored. EPR policies in principle relieve public sector actors of responsibility for waste management however local governments play several roles under the systems, particularly for information and collection of end-of-life products from consumers. Findings are that municipalities may perceive municipal organisations as more capable and willing to provide a higher environmental performance than private sector contractors and that municipalities lack regulatory tools to effectively influence local implementation. The thesis also identifies challenges for municipalities in negotiating contracts with producers that fully cover costs and finds that local political pressures can come to bear to continue delivering high levels of service to consumers irrespective of cost to the public systems. Waste statistics are unreliable and do not provide a reliable basis for comparing performance between municipal and private collection contractors nor between different municipalities. Recommendations are that producers should cover all system costs and municipalities working as collection contractors should do so entirely under market conditions. Local level performance measures and regulatory tools are required to ensure local performance of private sector and municipal contractors under the systems.

Executive Summary

Recently, environmental policy has seen a shift from focus from point sources of pollution toward product related environmental issues together with a shift toward outcome-based legislation that enables regulated parties freedom to achieve environmental objectives. Extended Producer Responsibility (EPR) in one such approach that shifts responsibility for product related environmental impacts away from public authorities to producers, with a focus on the end-of-life phase of the product life-cycle.

Aims are to achieve the often contradictory objectives of improving waste management and recycling while at the same time reducing pressure on public authorities and taxpayers. EPR is also intended to bring private sector financial and management resources to bear on waste issues to stimulate product and product system innovation. Legislation based on this approach has been implemented in many countries across a broad mix of product types. The concept of EPR has been characterised as a form of privatisation with the objective of achieving both environmental and economic benefits. By assuming responsibility for products producers are relieving public sector actors of their traditional responsibility and in principle freeing public sector resources to focus on other environmental priorities. In some cases, local governments play a role under producer responsibility systems, particularly for collection of end-of-life products from consumers. This thesis attempts to explore the rationales behind a local government role under the Swedish EPR systems and, where municipalities are involved, what the experience has been in delivering this role to date.

Objectives of this thesis are to explore the experience of Swedish municipalities through multiple instrumental case studies to (1) explore and analyse the rationales behind local government involvement in the EPR systems and (2) explore and analyse the consequences of this involvement. Four municipalities were profiled based on their involvement under the EPR systems for wastepaper (newsprint, print advertising, telephone directories etc.) and packaging.

The traditional responsibility of local governments for waste management has led to challenges in controlling environmental impacts from waste management and an absence of incentives for producers to consider environmental issues in product design. EPR seeks to address these concerns by shifting responsibility for environmental impacts of products to producers with a special focus on the end-of-life phase of the product life-cycle. The OECD defines EPR as:

> *an environmental policy approach in which a producer's responsibility (physical and/or financial), for a product is extended to the post-consumer stage of a product's life cycle. There are two key features of EPR policy: (1) the shifting of responsibility (physically and/or economically, fully or partially) upstream toward the producer and away from municipalities, and (2) to provide incentives to producers to take environmental considerations into the design of the product.*

Swedish municipalities are responsible for collection and management of household waste and source separation programs are highly developed. Collected wastes are managed with a focus on prevention as a top priority, followed by material recovery, energy recovery and landfill as a last resort. Household waste management is financed through fees charged to households and other generators of household type wastes. Management of materials regulated under producer responsibility systems is intended to be financed by producers.

Municipal Responsibility				Producer Responsibility						
Household waste	Bulky waste from households	Garden waste	Household hazardous waste	Paper packaging	Glass packaging	Metal packaging	Plastic packaging	Paper/newsprint	Electronics	Automobile tires

Source: Modified from Mattsson & Berg, 2000, in Mattsson, 2003

Early Swedish Producer Responsibility proposals were based in the notion of assigning 'complete responsibility for manufacturers, distributors and trade concerning take-back and reuse, recycling and energy recovery of packaging'. Concerning roles of various actors, authorities concluded that it would be impossible for public authorities to track and evaluate environmental impacts of all substances and products. It was also noted that that public authorities were even less well equipped to investigate and take measures to eliminate potential environmental impacts at the end-of-life phase of the product life-cycle and concluded that only producers could fulfil this role.

Following implementation of EPR systems for wastepaper and packaging Ordinances there have been significant differences in the way municipalities interpreted their responsibilities. Some municipalities consider it as their responsibility to manage all waste streams within the municipality whereas others take the position that producers should assume full responsibility for all aspects of the collection and management of their products.

For wastepaper and packaging, producers are required to provide a return collection system across all of Sweden and to recover wastepaper and packaging according to prescribed recovery targets. Consumers have a duty to separate wastepaper and packaging and transport these materials to Recycling Stations provided by producers.

Producers have organised themselves by establishing 'material companies', which collect and manage of wastepaper and packaging on a material by material basis. The material companies are Plastkretsen (plastic packaging), Metallkretsen (metal packaging), Returkartong (paper packaging), GlasÅtervinning (non-deposit-refund glass packaging), and Pressretur (wastepaper - newspapers, magazines, advertising materials, telephone directories etc.). Within each municipality several contractors commonly operate for the various material types. Reasons behind the separate management of each packaging material type were an interest on the part of the concerned packaging sectors to maintain strategic control over their packaging material type. Collection systems in Sweden:

- **Recycling Stations** – where consumers can deposit sorted wastepaper and packaging. Presently there are some 7 500 stations in Sweden, with the median distance from households being 400 metres. Litter has been a significant problem. The material companies hire collectors under competitive bidding processes.

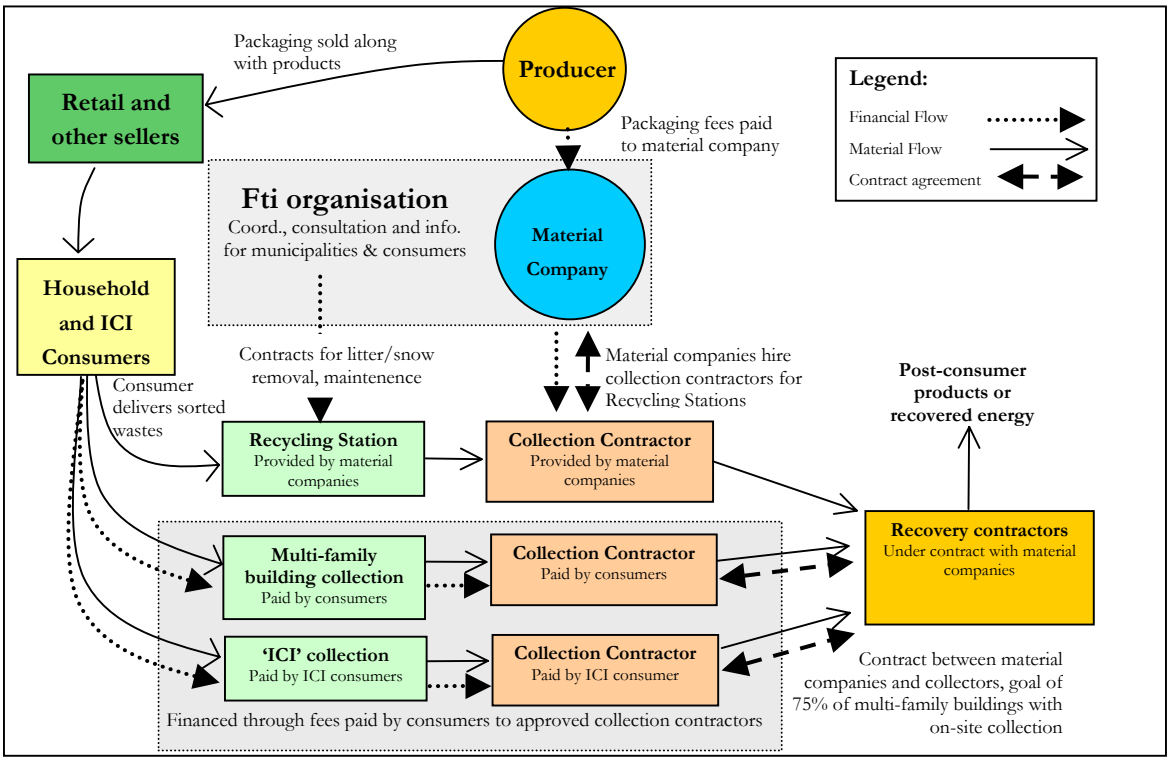
- Collection from **multi-family housing** is also being developed, although the collection is not fully financed by producers. Building owners hire collection contractors for this type of collection as a convenience for tenants and there is a free market for this type of collection. Producers have agreed to a voluntary target of serving 75 percent of multi-family housing units with by 2006. Both private waste

management firms and municipal waste management departments are active in this business.

- **Curb-side** collection from single family housing is provided by municipalities in a very limited number of instances, although costs are perceived to be very high for this service.

- Collection from **ICI sources** is provided through at least one Recycling Station being available in each municipality at no cost, although the generator of the wastepaper and packaging remains responsible for arranging transportation costs.

Recycling and recovery targets under the Wastepaper and Packaging Ordinances have been achieved for wastepaper and glass & paper packaging, while target shave not been met for the other material types, particularly plastic. Enforcement authority for the Wastepaper and Packaging Ordinances rests at the municipal level.



Case #1 Municipality of Lund

The Municipality of Lund is located in Sweden's southernmost County of Skåne. At 31 December 2004 Lund's population was 101 423 residents. In the early 1980's Lund began a source separation program to collect and recycle glass and newsprint at a number of municipally owned and operated collection stations. Lund opted to continue to operate the local collection system and political direction from City Council was to prepare bids for the collection contracts with the material companies. There was a desire to meet high environmental ambitions of citizens and City Council as well as offer a coordinated waste system for residents.

In 1996 when collection from the Recycling Station network began Lund held collection contracts with Metallkretsen and GlasÅtervinning and collected plastic, corrugated cardboard an paper-based packaging under subcontract agreements with the private firm Ragn-Sells AB

and the Sydåtervinning, a public-private partnership between the publicly owned firm SYSAV and IL-Recycling.

Under the collection subcontract for Plastic packaging Lund encountered problems in that the primary contractor frequently refuses payment for collected plastic packaging based on claimed poor quality source separation thus forcing the municipality to fully cover the collection costs from other revenue sources. In 2004 Lund won the primary collection contract for plastic and despite a low contract price, revenues are significantly higher since payment is no longer refused. Contract prices for all other material types are believed to cover the municipality's costs for collection.

Case #2 Municipality of Halmstad
The Municipality of Halmstad is a port city located on Sweden's west coast in the County of Halland. At 31 December 2004, Halmstad's population was 87 929 residents. In the early 1990s Halmstad's waste company began a source separation program to collect and recycle glass and newsprint at municipal collection stations.

With respect to the decision to compete for collection contracts with the material companies, Halmstad's waste company took the view that its role is to serve the interests and needs of its municipal owners and there was a view that the municipal organisation was better placed to effectively collect materials than private contractors. Also, coordination of collection of producer responsibility materials together with other wastes was seen as important for an effective system.

In the mid 1990's when collection of packaging and wastepaper began Halmstad's waste company won the primary collection contracts for the Recycling Stations with Metallkretsen, Plastkretsen, and GlasÅtervinning. The collection contracts for corrugated cardboard, paper-based packaging and newsprint under the Pressretur system were won by the private firm Stena Scanpaper, to which Halmstad negotiated a collection sub-contract agreement.

Case #4 Municipality of Göteborg
The Municipality of Göteborg is located on Sweden's west coast in the county of Västra Götaland. At 31 December 2004 Göteborg's population was 481 410 residents, however the regional population is considerably larger at roughly one million residents.

As a municipality Göteborg has significant environmental ambitions and as early as 1981 there was a municipal collection system in Göteborg for glass and newsprint. Later high quality aesthetically pleasing concrete recycling stations were constructed in locations strategically placed to maximise convenience following intensive efforts made in partnership with the city planning board. With implementation of producer responsibility systems the municipality sought to continue to be involved in the collection system to ensure a well coordinated infrastructure for all solid waste management in Göteborg.

There was also a lack of confidence in a system managed by many actors as well as an interest in protecting the large municipal investment in the existing collection system which was considered as among the best developed in Sweden. The municipal planning board was expressing concerns about aesthetic issues connected to the Recycling Stations that were proposed by producers and encouraged the municipality retain responsibility for the collection system rather than turn the system over to producers.

Prior to opening Göteborg's waste market to competition, the level of collection service provided by the municipal waste company was determined by the environmental ambition of

the municipality and the willingness of consumers to pay for that service. From the economic perspective, there was view that the municipal body was meeting an important pubic need and financial performance of the collection was not considered to be a major issue as long as the service was performed within a municipal department. In 1998 the Göteborg municipal Sanitation Company (Göteborgs Renhållningsverk) together with municipal waste organisations of ten surrounding municipalities merged to form Renova, a joint municipal company. When the regional waste management market was opened up and the producer responsibility contracts were soon recognised as a poor business proposal, which by fiscal year 2003/4 produced an annual loss of some SEK 15-20 million (€1.6 – €2.2 million).

In August, 2005 the municipality reached an agreement with producers to shift ownership of the network of Recycling Stations to producers who would assume full responsibility for maintenance, however there will be a reduction in the total number of stations. For collection from multi-family buildings, the municipality indicates that competition for market share is very intense, however many building mangers are unwilling to pay for required building modifications or for collection services.

Case #5 Municipality of Ystad

The Municipality of Ystad is a coastal port city located in Sweden's southernmost county of Skåne. At 31 December 2004 Ystad's population was 26 898 residents, however Ystad is a popular summer tourism destination at its population can be double that figure in the busy summer months. The Ystad Technical Services Department (Teknisk Service) is a Municipality of Ystad municipal department that is responsible for waste management.

In the 1980's early collection of wastepaper and glass was undertaken by community organisations and sports clubs as a means of raising revenues for their organisations. The paper industry paid for the collected newsprint and other paper materials based on the market value of the recovered paper fibre, while the glass industry paid the collectors for scrap glass voluntarily in order to maintain an environmental profile. The municipality did not formally participate in this work.

With the implementation of producer responsibility producers requested that Ystad work as a partner to develop a network of Recycling Stations within the city. The municipality took the position that producers alone should fulfil their obligations and there was political direction to avoid new municipal investments in equipment and infrastructure, although municipal land was provided to producers for the Recycling Stations. The municipality recognised that there was a potential that multiple collection contractors serving the material companies had the potential for increased heavy vehicle traffic. All collection contracts within Ystad are with private sector waste management firms and there is a 'coordination contractor' tasked with litter removal and station maintenance.

Because of the municipal responsibility for providing information to consumers, Ystad notes that producers will periodically request that information efforts on the part of the municipality be increased to improve source separation by consumers. The municipality takes the view that as a small community with limited resources information efforts cannot always meet the expectations of producers. Ystad Technical Services Department relies on producers to inform consumers about the collection and recycling system via a number of internet websites.

Discussion issues

The number of actors in the system has led to challenges in assigning responsibility for poor performance. This has been particularly the case for litter problems because of an inherent conflict between the interests of collection contractors and those of litter clean-up contractors.

That there has been a concerted effort over time on this problem suggests that litter is an inherent problem in 'bring' systems for packaging and other materials for recycling.

Collection from multi-family buildings is being expanded in Sweden to increase consumer convenience and roughly half of buildings are served with this level of service at present. There are suggestions that when collection occurs near the home consumer sorting efforts are more complete and in some cases there is also a higher quality of source separation observed.

	Recycling Stations	**Residents /station**	**Est. avg. distance**	**Multi-fam. bldg. coverage**	**Pop. in multi-fam. housing**
Case #1 Lund	18 (main muni.) 7 (outer villages)	3 901	400 - 600 m (main muni.) more in outer villages	70%	65%
Case #2 Halmstad	53 (main muni.) 20 (outer villages)	1 205	500 m (main muni.) more in outer villages	70%	50%
Case #3 Göteborg	436	1 104	400 m	20%	60%
Case #4 Ystad	9 (main muni.) 10 (outer villages)	1 416	No target & not measured. No stations in historic inner city	50%	46%

Rationales for a municipal role under the producer responsibility systems included coordination of producer responsibility with the municipal systems, environmental performance expectations and scale economy arguments. There is a perception that consumers prefer to interact with a single system for waste management. Further the legal responsibility for municipal solid waste planning creates a perception that municipalities lack tools to effectively direct control how the producer responsibility aspect of the local waste system functions. Where there is collection infrastructure that pre-dates producer responsibility municipalities are also seeking to protect their investment and seeking to continue delivering a high standard of service. The opportunity to achieve scale economies through shared overhead costs between management of producer responsibility materials and other household waste fractions was also noted.

The material companies engage collection contractors under competitive bidding processes. Fully 40% of Swedish municipalities (117 of 289) have won collection contracts for glass packaging as primary collection contractors and 34% collect metal packaging. This compares to 27% for plastic packaging, 17% for wastepaper and 7% for paper-based packaging. The number of municipalities collecting glass and metal suggest that municipalities may be seeking certainty that source separation of these materials is well managed given the possible impacts on incinerators.

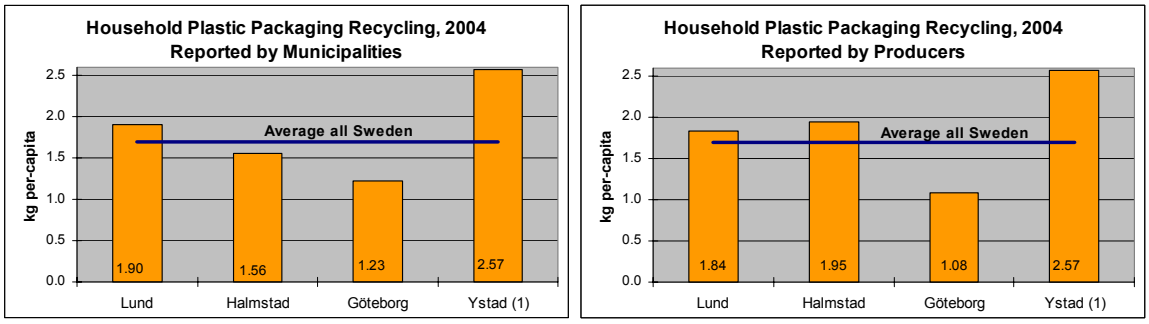
A majority of Swedish municipalities are very small. Fully 85% of municipalities are smaller than 50 000 residents, all together representing nearly half of Sweden's population. In this regard the municipal obligation to inform consumers regarding producer responsibility systems can be questioned respecting resources for an effective job. By comparison few actors in society are likely to have greater capacity to inform and influence consumer behaviour than wastepaper (print media) and consumer goods (packaging) producers and there is no reason the resources of these actors could not be applied to waste and recycling issues.

There can be challenges for municipal collectors concerning relative bargaining power of municipalities and producers during negotiation of collection agreements. Because municipal waste organisations are answerable to political leaders and the public, political pressures can

come to bear to ensure collection is handled to the expectations of the public, regardless of the financial aspects of collection contracts forcing a reliance of other financing mechanisms (household waste fees). Acquisition of collection equipment by municipalities can also weaken bargaining power since the Swedish Local Government Act prohibits municipal organisations from conducting business outside the municipal boundary.

Concerning collection and recycling results, the EPA publishes national level results annually. At the municipality level, producers as well as the profiled municipalities publish results for wastepaper and packaging. There are at times significant discrepancies between the figures reported by municipalities, particularly for corrugated cardboard and metal packaging. Municipalities indicate that waste statistics are a known problem and producers indicate that municipal results are often prepared without knowledge of materials collected by private operators.

The differences in municipal and producer results make comparisons of performance between municipalities uncertain. Further, since the results include all sources of packaging, local commercial activities that generate large volumes of packaging waste can skew results further complicating comparisons between municipalities. Producers do report results for plastic packaging as that from households only, which can provide an indication of the performance level from the perspective of household consumers. However, the large differences between the figures reported by producers and municipalities make it impossible to draw any reasonable conclusions based solely on the reported data.



Private sector waste management firms complain that municipalities are in some cases abusing the monopoly position over household waste management to subsidise competition in commercial waste markets. Competition authorities are firm and clear that there is no legal basis for municipalities to offer services in the private marketplace, which includes producer responsibility materials, in the absence of specific direction from government. Legislation anticipated in autumn 2005 to regulate 'public predatory pricing' has potential for significant impacts that extend well beyond the municipal role under the producer responsibility systems. There is a likelihood of new accounting rules respecting subsidised competition and a possibility of a strict prohibition against public actors competing in private markets altogether. Nonetheless, policy makers should consider the objectives of the producer responsibility systems and which actor (municipalities vs. private sector) is best placed to deliver the desired objectives.

Areas for future research include clarifying the international trade implications of municipal or other subsidies for collection of post-consumer commodities under EPR and other take-back systems. The relative performance of private sector and municipal collectors should be investigated and where differences are observed reasons behind the differences would be interesting to explore. The issue scale economy for municipalities when collecting producer responsibility wastes as well as other fractions of household wastes should be investigated.

Finally the question of quality of source separation when collection occurs near the home would be interesting to investigate.

Three research questions were posed:

Research question #1: In what ways are Swedish local governments participating in Swedish EPR systems for wastepaper and packaging?

In addition to legal responsibilities for consultation with producers and enforcement, some 40% of Swedish municipalities (117 of 289) are collecting glass packaging as primary collection contractors. 34% collect metal packaging and 27% for plastic packaging, 17% for wastepaper and 7% for paper-based packaging. The number of municipalities collecting glass and metal suggests municipalities may be seeking certainty that source separation of these materials is well managed given the possible impacts on incinerators and worker injury risks from broken glass in household waste.

Municipalities have provided land for the network of Recycling Stations generally at no charge to producers. Municipalities that are engaged as primary collection contractors by producers have invested in infrastructure for the Recycling Stations (containers, collection vehicles) and in some cases post-collection sorting facilities.

Research question #2: What are the rationales and objectives behind local government delivering functions under Swedish wastepaper and packaging EPR systems?

Municipalities perceive a need to ensure coordinated delivery of all waste management services within a municipality. This perception is amplified by the municipal obligation under the Environmental Code for solid waste planning and the lack of effective legal tools to regulate local collection service provided by producers. There can also be a perception that municipal actors are capable of delivering higher environmental performance due to local knowledge issues as well as the differing motives of private actors.

Where there are legacy investments in source separation infrastructure that pre-date the emergence of producer responsibility municipalities are seeking to protect their investments and the public's trust by continuing to operate the local collection system. Municipalities are also seeking to achieve scale economies by collecting wastepaper and packaging.

Research question #3: What has been the experience of Swedish local governments in delivering functions under the producer responsibility systems?

Because of bargaining power and competitive pressures, municipal organisations can be challenged to negotiate contracts with producers sufficient to meet local needs and ambitions. Political pressures can come to bear on municipal organisations to continue to perform irrespective of financial aspects of collection contracts, serving to insulate producers from the full costs of the producer responsibility system.

Municipalities have in some cases benefited from collecting materials under the producer responsibility systems by deriving new financial resources from producers and through scale economies. This is particularly the case where private sector actors do not possess local resources and municipalities are able to negotiate favourable collection contracts.

Implications for EPR policy
The following recommendations are made concerning the role of municipalities:

1. Where municipalities are performing collection or other functions, this work should be undertaken under market conditions.

2. Municipalities require either regulatory tools to influence the local implementation of the producer responsibility system or explicit relief from responsibility for producer responsibility materials.

3. Measurable performance indicators at the local and national levels would enhance confidence in the performance of the producer systems. Where performance is insufficient, enforcement authorities should be empowered to take action.

4. Market competition policy is likely to move toward more liberalised approaches and capacity to effectively regulate private actors in delivering waste and recycling functions is needed.

Recommendations relevant to the profiled cases:

1. The Swedish EPA should consider defining a level of service that producers are required to provide and take measures to ensure a more full cost internalisation of system costs. Approaches such as charges and fees collected from consumers at the point of disposal (e.g. from multi-family buildings) should be discouraged.

2. Given the potential for significant changes in the legal environment within which municipalities operate following the anticipated competition legislation, the Swedish EPA should work with the Competition Authority to clarify and plan any required transition within the producer responsibility systems. The issue of international trade and municipal and other subsidies under EPR systems should be clarified.

3. There is a need for reliable wastepaper and packaging collection and recycling statistics to enable an evaluation of collection performance of different municipalities.

Table of Contents

List of Figures

List of Tables

1 Introduction

One of the major trends in environmental policy in recent years has been the shift away from a focus on point sources of pollution toward product and product related environmental issues. A second trend has been the shift toward less prescriptive and more outcome-based legislation to enable regulated parties freedom to find innovative means of meeting environmental objectives. Extended Producer Responsibility (EPR) is one such policy approach which seeks to shift responsibility for product related environmental impacts away from public authorities to producers, with a particular focus on the end-of-life phase of the product life-cycle.

By shifting responsibility in this way, policy-makers are aiming to achieve the often contradictory objectives of improving waste management and recycling while at the same time reducing pressure on public authorities and taxpayers. Policy makers also indicate that they are striving to create market-based incentives for producers to stimulate product and product system innovation in addition to bringing private sector financial and management resources to bear on waste issues. Legislation based on this approach has been implemented in many countries across a broad mix of product types, most notably for packaging but also for household hazardous wastes, medications, various batteries, end-of-life vehicles, and recently for electrical and electronic equipment.

1.1 Problem definition

While elements of an EPR approach were first implemented some thirty five years ago with the introduction of statutory beverage container deposit-refund systems, the earliest and most well known EPR system was implemented in the early 1990s under the German Packaging Ordinance, which established the Dual System for packaging. Following the implementation of the Dual System in Germany, many other jurisdictions have since implemented producer responsibility systems for packaging and other materials.

The concept of EPR has been characterised as a form of privatisation with the objective of achieving both environmental and economic benefits. The primary motivation for such an approach has been said to be a shift of responsibility and costs for product end-of-life management from public authorities to concerned producers thus driving environmentally conscious innovation. By assuming responsibility for their products producers can relieve public sector actors of their traditional responsibility and in principle free resources to focus on other environmental priorities. In this respect much of the discussion on EPR has been centred on which party pays for end-of-life product collection and management (e.g. taxpayers/local authorities vs. producers) rather than who physically operates the system. Under EPR systems in some countries responsibility for producers can mean simply paying local governments to collect materials whereas in others producers assume responsibility for all system aspects and typically contract with private sector waste firms to collect and manage end-of-life products. What has not been investigated in detail to date is the experience of municipalities in delivering various functions under an EPR system.

1.2 Why examine local governments and EPR?

EPR policies are based on the assumption that internalisation of end-of-life management costs into product prices will stimulate producers to integrate environmental considerations into product design, thus leading to long run improvements in environmental performance. Assuming the validity of this assumption, the incentive for producers to consider end-of-life

management costs in product design will logically be related to the degree to which end-of-life management costs are internalised in a manner that is seen by the producer and reflected in product prices. While stimulating product design change is a regional/national objective of policy makers, municipalities will also have local waste diversion and recycling objectives. Producers as the regulated parties under EPR legislation will also have their own objectives of meeting their legal obligations while minimising costs.

Where local governments are engaged by producers under commercial agreements to perform collection and other functions, the dynamic between producers and local governments has not been explored in detail to date. This thesis therefore attempts to explore the rationales behind a local government role under EPR systems and, where municipalities are involved, document the experience of the local governments in delivering this role to date.

1.3 Why wastepaper and packaging in Sweden?

Wastepaper and glass packaging has been collected in Sweden by local governments for many years. EPR legislation for wastepaper and packaging has bee in force for some ten years, and in principle, Swedish municipalities do not bear responsibility for collection nor material processing. Nonetheless, a significant number of Swedish municipalities have opted to enter into commercial agreements with producers to collect wastepaper and packaging under the Swedish EPR systems. The experience of these municipalities in delivering various functions on behalf of producers will likely provide insights into the broader question of the role of local governments under EPR systems.

1.4 Objectives and research questions

By summarising the Swedish EPR systems for wastepaper and packaging in general terms and exploring the experience of selected municipalities through detailed case studies this thesis aims to (1) explore and analyse the rationales behind local government involvement in the EPR systems and (2) explore and analyse the consequences of this involvement.

To achieve these objectives, three research questions are posed:

1. **In what ways are Swedish local governments participating in Swedish EPR systems for wastepaper and packaging?**

2. **What are the rationales and objectives behind local government delivering functions under Swedish wastepaper and packaging EPR systems?**

3. **What has been the experience of Swedish local governments in delivering functions under the producer responsibility systems?**

1.5 Scope and limitations

The EPR systems under study include the wastepaper and packaging systems and in particular the local implementation and operation of these systems in four municipalities. Issues excluded from the scope of the thesis include the broader economic consequences of the EPR system such as influences on taxation rates, retail prices and effects on post-consumer commodity markets. Also excluded are the potential environmental impacts resulting from the operation of the EPR systems from activities such as consumers driving vehicles to collection

points and environmental impacts of recycling as compared to other waste management methods for various material types.

Four municipalities are investigated in detail. It must be acknowledged that while these cases may be indicative of general experiences to some degree, each municipality has unique circumstances and the cases under study may not necessarily be representative of all municipalities in Sweden.

These case studies were compiled based on personal interviews with municipal officials and representatives of related waste management firms. Efforts were made to ensure the quality and accuracy of the information provided, however, it must be acknowledged that there are always sources of error and omissions. This is particularly the case with respect to interpretation and translation from Swedish to English, which is the primary language in which all research work was conducted. In this respect, any errors or omissions in these cases remain the responsibility of the author.

The thesis was undertaken from the perspective of viewing cost internalisation of environmental costs, and in particular end-of-live management costs, as an effective means of stimulating environmental innovation. Further, the thesis was also undertaken on the assumption, based on literature and observations in other jurisdictions, that EPR policy tools can be an effective means of achieving cost internalisation and can lead to innovation and waste reduction. Consequently, there exists an acknowledged potential for bias in the manner in which the information in this thesis was collected and interpreted which has potential to influence the findings and this potential should be noted by readers.

1.6 Methodology

To provide a theoretical basis for this thesis a literature review summarising the key aspects of the EPR policy principle was performed to identify and summarize the conditions under long run environmental benefits have been observed as well as how the principle has been implemented in different jurisdictions with respect to the role of local governments. The rationale for this portion of the thesis was to provide an understanding of the EPR policy principle and how it has been implemented in different jurisdictions as well as summarise the main issues respecting the role of local governments.

The next phase of the thesis involved profiling the Swedish EPR systems for wastepaper and packaging. Here the systems are described in detail in terms of their operation and the role of the various actors involved. The purpose of this section is to provide an understanding of the system in detail to provide a clear picture of the systems to understand the roles assumed by the local governments profiled in the case studies.

The experience of local government in performing functions under EPR systems is of interest beyond the Swedish context. Accordingly, multiple instrumental case studies of implementation of the Swedish wastepaper and packaging EPR systems were prepared through in-depth open-ended interviews with municipal representatives and other relevant actors. The objective was to understand reasons behind municipalities seeking out a role under the producer responsibility systems. Four municipalities were profiled based on their involvement under the systems: three which are actively involved as collection contractors for producers and, as a basis for comparison, one municipality which chose to have producers engage the private sector. The selection was further based on availability of municipal officials over the Swedish summer period and accessibility from Lund in Southern Sweden. The four selected municipalities were Lund, Göteborg, Halmstad and Ystad.

The EPR systems were analysed with respect to the rationales behind municipal involvement, the financial and operational consequences of this involvement and the implications for the environmental performance of the systems. Conclusions were drawn based on the cases and several recommendations were forwarded.

1.7 Analytical framework

As a means to systematise the examination of the infrastructure of an EPR system, a systematic framework was developed by Tojo (2004). Tojo described three main activities required under an EPR system: collection and sorting of materials, environmentally sound recovery and monitoring and enforcement. For each of these activities, Tojo noted that in delivering these functions different actors may be involved in the physical management of products, which can require differing financial mechanisms and information management needs.

Tojo's framework is employed here describe the systems under review and each of the four municipal cases and provide for a structured analysis of the systems. The interaction between the elements and the actors delivering the various functions will be analysed with respect to their influence on achieving key goals of collection, treatment, recycling and, ultimately design improvements. Table 1-1 illustrates the framework.

Table 1-1 Elements of a return-collection infrastructure

Type of responsibility	**Activity**			
		Collection	**Recovery**	**Monitoring & Enforcement**
	Physical management	Element 1	Element 4	Element 7
	Financial mechanism	Element 2	Element 5	
	Information management	Element 3	Element 6	

Source: Adapted from Tojo, 2004

For the purpose of this thesis, the **'collection'** function is defined as the provision of return-collection infrastructure (depots, bins etc.) and transportation of the wastepaper and packaging from collection sites for recovery. Consolidation of materials at aggregation sites shall be considered a component of the collection function, while sorting of materials after collection to remove contaminants or correct deficiencies in source separation by consumers is deemed a component of recovery. Elements of collection include:

Element 1 - How is wastepaper and packaging collected? Which actors are involved in this collection and to where are collected materials transported?

Element 2 - How is the collection infrastructure and physical collection of materials financed?

Element 3 – How is the relevant information for consumers and local governments provided? Which actors are providing this information?

The **'recovery'** function is defined as any material sorting of wastepaper or packaging after source separation and deposit by consumers as well as processing to recycle materials into new products or recover energy. Elements of recovery include:

Element 4 Which actors are physically carrying out the material sorting, processing and recovery?

Element 5 How is the recovery financed? Who bears responsibility for the quality of collected and processed materials?

Element 6 Which actors are responsible for communicating quantities of processed/recycled material to central government authorities, municipalities and consumers? How is this communication being accomplished?

The **'monitoring and enforcement'** function includes overall system oversight, monitoring the market for free riders and enforcement of non-compliance among producers and consumers.

Element 7 Which actors are responsible for system oversight and enforcement and how is this implemented in practice?

1.8 Outline

Section one introduces the topic of the thesis and defines the research problem and questions and analytical framework. Section two describes the EPR policy principle and some of the aspects of the debate surrounding its implementation. Section three provides a background on policies for waste management in Sweden and a description of the origins of EPR in Sweden. Section four describes the Swedish EPR systems for wastepaper and packaging in detail. Section five profiles the implementation of the wastepaper and packaging systems in four Swedish municipalities. Section six discusses and analyses the rationales behind the local government roles under the systems while Section seven describes the conclusions of the thesis.

2 Extended Producer Responsibility

Production and consumption in society has traditionally been based around a model where producers supply goods and services demanded by consumers. Products that reached their end of life were disposed by consumers and local governments have traditionally been responsible for managing these wastes. With increases in material living standards there has been a corresponding increase in wastes requiring disposal. In addition to growing quantities of waste, local governments cannot meaningfully influence the nature of products disposed by consumers which can lead to challenges in reducing environmental impacts from waste management.

2.1 EPR policy

EPR shifts responsibility for environmental impacts of products from local governments to producers with a special focus on the end-of-life phase of the product life-cycle. The Organisation for Economic Cooperation and Development (OECD) has characterised EPR policy approaches as altering the traditional responsibilities of manufacturers, consumers and local governments with respect to product end-of-life management (OECD, 1998). The OECD and quite a number of other observers have noted that it is producers which are most able to influence product related environmental impacts and waste management costs in their capacity as product designers. In this respect, unique and important features that distinguish EPR policies from other waste management and recycling approaches is the capacity to achieve waste prevention and life-cycle environmental improvements across all phases of the product life-cycle.

In 2001, the OECD published a Guidance Manual for Governments on EPR (OECD, 2001), where EPR was defined as:

> *'an environmental policy approach in which a producer's responsibility (physical and/or financial), for a product is extended to the post-consumer stage of a product's life cycle. There are two key features of EPR policy: (1) the shifting of responsibility (physically and/or economically, fully or partially) upstream toward the producer and away from municipalities, and (2) to provide incentives to producers to take environmental considerations into the design of the product.' (OECD, 2001)*

An important feature of EPR policy is the capacity to achieve the often contradictory objectives of reducing burdens on public authorities and taxpayers while at the same time improving waste management and recycling. Also implicit in the EPR policy approach is the aim of policy makers to bring new financial and management resources to bear on waste management issues.

Lindhqvist (2005) describes key policy objectives that EPR systems are intended to achieve. These include: (1) *Effective collection* of products, (2) E*nvironmentally sound treatment* including dismantling and/or sorting to enhance the potential for reuse and recycling, (3) R*euse and recycling* such that recovered materials can substitute for virgin materials and (4) D*esign improvement* for products and product systems through the provision of incentives for producers. Lindhqvist (2000) also described different forms of responsibility for which producers could be responsible. These include:

- **Economic responsibility** – where producers are responsible for all or part of the financial costs of product end-of-life management.

- **Physical responsibility** – where producers are involved in physical management of products or product related environmental impacts.

- **Informative responsibility** – referring to a producers' responsibility to provide information on environmental aspects of products.

- **Liability** – where producers are responsible for environmental damage caused by products, including impacts during the usage and end-of-life phase.

Linking these different types of responsibility is where producers retain **ownership** of products and thereby retain all of the above responsibilities. Producers might retain ownership of products through, for instance, leasing or product-service system arrangements.

2.2 Producer Responsibility Organisations

In carrying out their responsibilities under EPR legislation producers frequently organise consortia or collective entities referred to as a 'Producer Responsibility Organisations' or PRO. The role of the PRO is to enable individual companies to pool resources and collectively discharge their responsibilities through the day to day operation and administration of the EPR system (OECD, 1998). As a financing mechanism, producers typically pay fees to the PRO to cover the future collection and recycling costs of their products and the required fees are usually set based on anticipated revenues from the sale of post-consumer commodities collected under the system (OECD, 1998). Generally participation under a PRO is not compulsory for producers however in such instances the producer will need to meet their responsibilities independently, which can be a challenging task for even very large producers.

Because of the central organising role of the PRO in coordinating the EPR system, concerns have been expressed regarding PROs as potential monopolies. Domestic producers could potentially take advantage of their dominant position in the management of the PRO to impose barriers to imported products (OECD, 2001). Because market access can be dependent on collaboration with a PRO Lindhqvist also pointed out the importance of PROs operating in a non-discriminatory manner between different companies (Lindhqvist, 2000). Further, where PROs take responsibility for very large quantities of materials there is potential that the size of collection and recycling contracts offered could pose a barrier to entry on the market for smaller firms with undesirable competition implications (Lindhqvist, 2000).

2.3 Municipalities and EPR

One of the central debates concerning EPR legislation has been the question of sharing responsibility between producers and other actors in society for the operation of the EPR system. In this respect the historical and ongoing role of local governments in waste management has led many to advocate for an ongoing role for municipalities in performing various functions, particularly for collection responsibilities. However, there have also been approaches where governments seek to 'equitably' allocate costs among actors in the product chain and among local government.

While it is generally recognised that it is producers that have the greatest ability to influence the design of products, there has been debate regarding whether producers are best placed to operate the collection system. As part of the debate, there have been many arguments against an allocation of responsibility to producers, generally by business or industry representatives

seeking to share responsibilities with other actors. One prominent critic of EPR policies is the Business and Industry Advisory Council (BIAC) to the OECD, an international business lobby organisation. The BIAC has publicly criticised EPR policies on the grounds that there is an underlying economic inefficiency in establishing multiple parallel waste collection system for various products without meaningful environmental benefit (BIAC, 1998).

Expressing reluctance to impose any shift of responsibility from end-users (taxpayers via municipalities) to producers, the US EPA has advocated instead for the concept of shared responsibility among suppliers, retailers, consumers, disposers and governments terming such approaches 'Extended *Product* Responsibility' (USEPA, 1998). Palmer & Walls of Resources for the Future in their assessment of EPR policies argue that alternative policy approaches such as a combined upstream taxes on raw materials and unit based pricing of waste disposal charges by municipalities would more cost effectively achieve waste reduction goals than EPR policies. Without a shift in responsibility from end-users, these are implicit arguments in favour of an ongoing local government role in waste management. The US Council for International Business has taken a similar position in advocating for a *Shared Product* Responsibility whereby government, rather than producers, retains a responsibility to provide and regulate solid waste management systems (USCIB, 1997).

From the local government perspective, there have been arguments in favour of retaining a role under EPR systems for local governments that can be seeking to retain local employment and control over local collection (Tojo & Hansson, 2003). However, when discussing early producer responsibility proposals the Swedish Confederation of Industry recognised that if producers were to assume responsibility for waste there would be a concurrent need to control the functioning of the system (Jobin, 1997). Without such control, it was felt that EPR would simply represent a form of taxation that would not achieve long terms environmental benefits. In a similar argument when the OECD noted that where responsibility and costs are shared by local authorities the incentives for producers to take all steps necessary to achieve the highest levels of waste prevention, collection, re-use and recycling that only producers are able to accomplish (OECD, 1998).

2.4 EPR and innovation

Implicit in many arguments in favour of EPR is the notion of environmental innovation both in the design phase of products and product systems and also in the downstream collection and recovery infrastructure. This speaks to another trend toward more outcome-based legislation that enables regulated parties freedom to find innovative means of meeting environmental objectives. Accordingly many, including the OECD (2001), advocate that EPR legislation should be based around the model of clearly defining desired outcomes but granting flexibility for producers to determine the means by which the outcomes are achieved, thereby maximising the potential for innovation.

Examining the features of EPR systems that are most likely to lead to success, Tojo (2004) noted that the most important factor in promoting upstream changes in product design is whether or not producers, rather than consumers, pay the actual costs of managing products. Tojo further noted that the linkage between the downstream infrastructure and the upstream product designers is critical in stimulating producers to consider design changes and that the more direct the linkage is between these elements the greater stimulus for design. Lindhqvist (2000) also noted that for EPR systems to be successful in stimulating innovation in product design, producers should be allocated full physical and economic responsibility for their products.

3 Swedish waste policy & EPR

3.1 Background

Sweden is a northern European country with a population of 9 011 392 at December 31, 2004 (SCB-Statistics Sweden, 2005 a). As home to some 85% of the population, vast majority of Swedes reside in the more densely populated southern regions of the country. Major Swedish cities include Stockholm, the national capital with a regional population of roughly 1.8 million residents, Göteborg, with a municipal population of 481 000 and a regional population of roughly one million and Malmö with a population of some 270 000. Aside from these large centres, Swedish municipalities are generally quite small with 85% having fewer than 50 000 residents, with the median being just slightly over 15 000 (SCB-Statistics Sweden, 2005 a). Respecting housing patterns, at December, 2001, for which the latest data are available, 58.5% of Swedes resided in single-family homes while 41.5% resided in multi-family housing (Göran, 2005).

Sweden is governed and managed at central, regional and local levels of government and administration, each level with different powers and responsibilities. The Swedish Parliament (Riksdag), located in Stockholm, comprises 349 representatives that are elected at four year intervals in general elections. The main functions of the Parliament are to pass legislation and scrutinise the work of the government in its administration of the country. The central government carries out its work through ministries, each with responsibility for a given policy area. The ministries are primarily responsible for legislation and planning matters, while practical implementation is carried out by central agencies, of which there are some 300, each of which fall under the responsibility of one of the ministries (Sveriges Riksdag, 2005). The Swedish Ministry of Sustainable Development bears primary responsibility for the government's work on sustainable development, which includes environment, energy, emissions trading, construction and housing issues. Under the responsibility of the Ministry of Sustainable Development is the Swedish Environmental Protection Agency (SEPA) which is responsible for implementing and evaluating environmental policy and coordinating Sweden's environmental work with the EU (Sveriges Riksdag, 2005).

At the regional level, Sweden is divided into 21 County Administrative Boards, which are appointed by and represent the central government, and 20 County Council districts[1], whose council members are elected by local constituents on four year terms (SALAR, 2004). The County Administrative Boards administer the regional responsibilities of the central government in matters with a strong national interest such as policing, emergency services, food control and various types of permits. The County Councils are elected bodies whose most important responsibility is the provision of healthcare, but also deliver education and cultural services such as museums and theatres (Sveriges Riksdag, 2005).

At the local level, Sweden is divided into 289 municipalities, to which significant decision making authority has traditionally been delegated. Key responsibilities of the municipality include education, social welfare and health & environmental protection. The operations of local governments in Sweden are defined under the Swedish Local Government Act which both defines and establishes limits on the role of municipalities in Sweden.

[1] The different number of County Councils and County Administrative Boards is because the Municipality of Gotland also assumes County Council responsibilities.

Concerning environmental responsibilities, municipalities are responsible for delivery of certain environmental functions, such as waste management, but also for enforcement of national environmental legislation within the municipal boundary. The municipal enforcement organisations are administratively independent from the organisations delivering environmental services (Swedish Association of Local Authorities and Regions-SALAR, 2005). Operations of the municipalities are financed through taxes on the income from local residents, central government grants and fees for services.

3.2 Household waste in Sweden

Under the Swedish Environmental Code (1998), waste is categorised into the three main classes of hazardous waste, industrial waste and household wastes. Irrespective of the where generated the household waste category includes waste from residential sources and wastes of a similar nature which are generated by industry, businesses and public services (Hartlen, 1996). Management of industrial wastes is the responsibility of the firms generating the wastes and the environmental requirements respecting the appropriate management of these industrial wastes is governed together with other environmental issues under Swedish Environmental Code. Similarly, management of hazardous industrial wastes is the responsibility of the industrial generator, however municipalities are empowered to collect and manage these wastes from industry if they so chose. Hazardous waste originating from households is by law treated as domestic household refuse (Hartlen, 1996).

Municipal responsibility for collection and management of household waste was enshrined into Swedish law in 1972 (Petersen and Berg, 2004). By the early 1990s the Swedish EPA recognised waste as a growing environmental problem and in 1991 municipalities were required to develop comprehensive waste management plans (Hartlen, 1996). These plans, together with a local waste management regulation, were to govern waste disposal and describe the measures that will be taken to reduce both the quantity and hazardousness of all wastes generated in the municipality, not only those for which the municipality bears primary responsibility for collection and treatment (Hartlen, 1996). As an outcome of the waste management plans and regulations implemented by the municipalities, source separation programs for household waste became highly developed with significant public support and participation (Hartlen, 1996).

Consistent with overall Swedish waste policy, management of household wastes is based around the waste hierarchy which focuses on waste prevention as a top priority, followed by material recovery, energy recovery and landfill as a last resort (SMSD, 2003). The hierarchy is depicted in Box 3-1.

Box 3-1 Waste management hierarchy, Sweden

1. **Smaller volume and harmless waste -** reduce consumption of resources and the spread of toxic substances
2. **Material recovery -** Saves resources and energy compared with use of new raw materials
3. **Energy recovery -** Incineration makes use of energy in waste for which material recovery is not worthwhile
4. **Landfilling -** As a last resort, when neither materials nor energy can be recycled

Source: Swedish Ministry of Sustainable Development, 2003

Types of municipal organisations active in managing waste include both municipal departments and municipal owned corporations, which can be owned by one or more municipalities to facilitate regional cooperation in waste management. However, a considerable number of municipalities are contracting the collection of household waste to private firms. A 2005 study by the Swedish Transport Association on the market for household waste collection found that some 51% of Swedish municipalities contracted waste collection services to private firms, 47% delivered this service directly with the remaining 2% under private-public partnerships of various types (SA, 2005). Figure 3-1 illustrates the Swedish market for household waste collection in spring 2005.

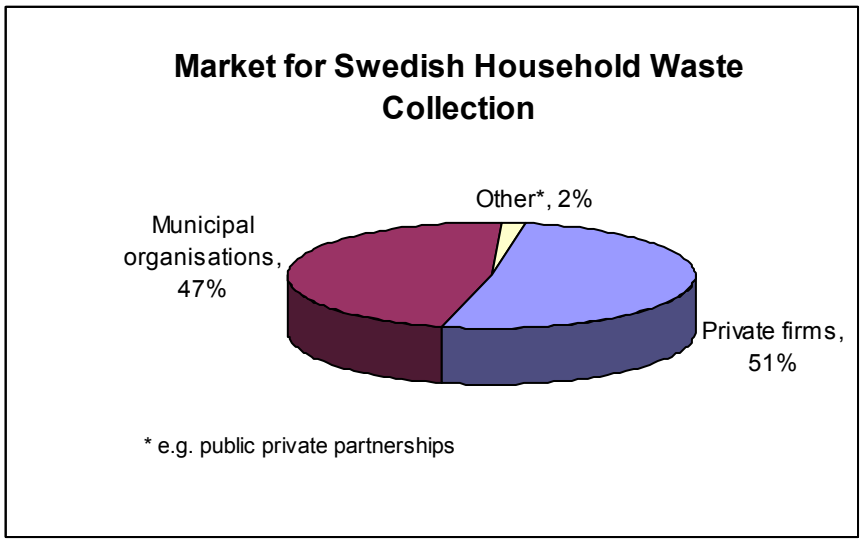


Figure 3-1 Household waste management in Sweden, 2003

Source: Sveriges Åkeriföretag, 2005

3.3 Financing of household waste management

The Swedish Association of Waste Management, an organisation representing municipalities and municipally owned waste companies serving some 95% of the Swedish population prepares annual summaries of the waste management situation in Sweden. In its summary for 2003, the Association noted that, other than for wastes regulated under producer responsibility systems, household waste management is almost exclusively financed through fees charged to generators of household type wastes (RVF, 2003). The fees, which are set by the municipalities, are often set in a manner to serve as an economic incentive for households to handle wastes in an environmentally responsible manner by participating in source separation programs. In some instances, fees are variable based on factors such as the participation in home composting and/or other source separation or waste minimisation schemes.

Management of materials regulated under the producer responsibility systems is intended to be financed by producers and these costs are either integrated into product prices or absorbed into profit margins. The level of these fees and the manner in which they are charged to producers are determined by the concerned parties and government does not regulate producers in this regard.

Box 3-2 illustrates the division of responsibilities for household waste management in Sweden.

Box 3-2 Responsibility for household waste management, Sweden

Municipal Responsibility				Producer Responsibility						
Household waste	Bulky waste from households	Garden waste	Household hazardous waste	Paper packaging	Glass packaging	Metal packaging	Plastic packaging	Paper/newsprint	Electronics	Automobile tires

Source: Modified from Mattsson & Berg, 2000, in Mattsson, 2003

3.4 Household waste quantity and treatment

Respecting total waste quantities, the Swedish Association of Waste Management indicates that 4 172 200 tons of household waste was generated in Sweden in 2002, representing 476 kg per inhabitant (RVF, 2004). In terms of management methods, the hazardous waste component from domestic sources represented 0.6% of total waste (23 000 tons) and was treated using a variety of methods. The separated organic fraction represented 8.5% and was managed via biological treatment, including an estimated 70 000 tons of small scale home composting. A further 19.8% of household waste was land-filled in some 260 land-fill sites, 40.1% treated in twenty six waste-to-energy plants and 31% was recycled (RVF, 2004). Major recent trends in disposal and treatment methods include a restriction on land-fill of separated combustible wastes in 2002 and a restriction on land-fill of organic materials set to come into force in 2005 (Mattsson, 2003). Figure 3-2 illustrates the relative proportion of each of these waste management methods for 2003.

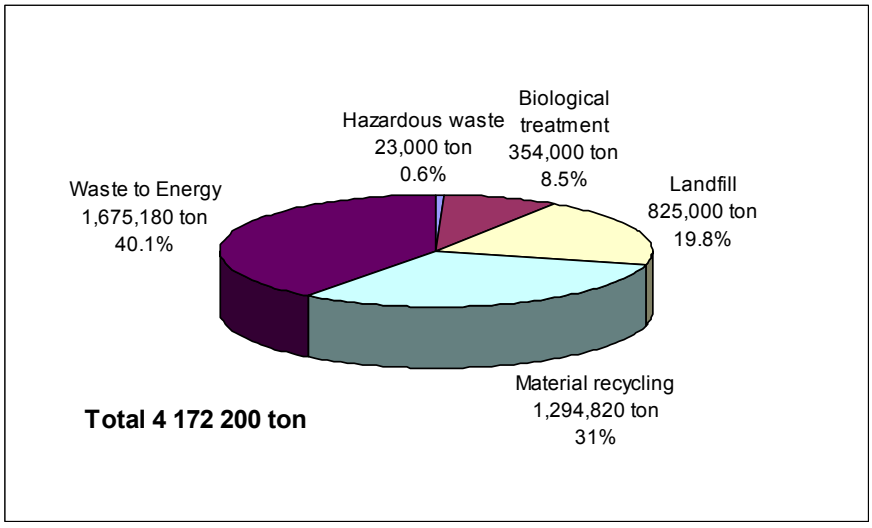


Figure 3-2 Household waste management in Sweden, 2003

Source: RVF, 2004

3.5 Origins of Extended Producer Responsibility in Sweden

According to Lindhqvist (2000) the concept of EPR was first introduced to the Swedish government in a 1990 report he co-authored entitled Models for Extended Producer Responsibility.[2] Lindhqvist describes a number of key actions that took place following this report, including a Government request that the Minister of the Environment establish a commission with a mandate to investigate opportunities and measures to promote reusable packaging. This mandate of the commission was later expanded to include elaborating on a proposal for assigning 'complete responsibility for manufacturers, distributors and trade concerning take-back and reuse, recycling and energy recovery of packaging'. An important conclusion of the commission was that producers, in their capacity as packaging designers, manufacturers and transporters were the party that most influences the environmental impact of packaging (Lindhqvist, 2000).

Later, a 1992 report by the Swedish Ministry of the Environment and Natural Resources on EPR for wastepaper and nickel-cadmium batteries concluded that it would be impossible for public authorities to track and evaluate environmental impacts of all substances and products. The report also noted that public authorities were even less well equipped to investigate and take measures to eliminate potential environmental impacts at the end-of-life phase of the product life-cycle and concluded that only producers could fulfil this role (Lindhqvist, 2000).

At the municipal level, Lindhqvist noted that in early Swedish waste reduction efforts municipalities were subsidising recycling activities and that fluctuating market prices for post-consumer commodities was leading to difficulties in waste management planning at the municipal level (Lindhqvist, 2000). Given these difficulties, the Swedish Association for Waste Management, representing municipal waste managers, together with private waste management companies repeatedly requested government action in the form of EPR for wastepaper. These proposals were rejected by the concerned industry as represented by the Swedish Forest Industries Federation on grounds that a lack of market competition in the waste sector would inhibit cost-efficiency leading to unnecessarily high wastepaper prices[3] (Lindhqvist, 2000).

The 1993 Ecocycle Bill (Proposition 1992/93:180) formally laid the foundation for the development of EPR policy in Sweden. While it did not in itself establish any particular EPR system, the Ecocycle bill proposed changes to existing legislation to establish producer responsibility systems and defined a 'producer' as a person who professionally manufactures, imports or sells a product or package (Lindhqvist, 2000). The bill further established the Swedish Ecocycle Commission which was charged with responsibility to develop a strategy to adapt goods used in society to the needs of a closed loop system, and to propose how producer responsibility should be implemented for different product groups in consultation with the relevant industries (Construction Sector Ecocycle Council, 2005).

Agreements reached within the Commission respecting packaging, wastepaper (newsprint, print advertising, telephone directories etc.) and automobile tires were the first product groups chosen by government to be regulated under statutory producer responsibility. By amendments to the Waste Collection and Disposal Act, Ordinances establishing producer

---

[2] Lindhqvist, Thomas, & Lidgren, Karl. (1990). Modeller för förlängt producentantsvar [Models for Extended Producer Responsibility]. In Ministry of the Environment, *Från vaggan till graven – sex studier av varors miljöpåverkan* [From the Cradle to the Grave – six stuudies of the environmental impact of products]. Ds 1991:9; pp16-17.

[3] Described in Ryden, Erik. (1992). *Förlangt producentansvar inom Svensk pappersåterninning* [Extended Producer Responsibility in Swedish Paper Recycling]. RVF Rapport 92:9. Malmö: Svenska Renhållningsverks-Föreningen, p. 20, in Lindhqvist, 2000

responsibility systems were enacted for these product groups in 1994, and a system for electrical and electronic equipment was implemented in 2001. In addition to these statutory EPR systems, voluntary commitments have been reached respecting collection and recycling systems for office paper and plastics used in agriculture (SEPA, 2005a).

Presently the Swedish EPA indicates that the long term purpose of producer responsibility is to:

> *…lead to more environmentally responsible product development [and] in this way, producer responsibility becomes an instrument to induce producers to develop products that are more resource efficient and easier to recover/recycle and do not contain environmentally hazardous substances* (SEPA, 2005a).

Following implementation of the Wastepaper and Packaging Ordinances, Mattsson (2003) indicates that there have been significant differences in the way municipalities have interpreted their responsibilities. Some municipalities consider it as their responsibility to manage all waste streams within the municipality whereas others take the position that producers should assume full responsibility for all aspects of the collection and management of their products (Mattsson, 2003). With regard to the role of municipalities in collection, there was a concern on the part of Swedish industry that if municipalities continued to operate the collection system and producers were required to finance this collection, they would be unable to control costs or the quality of collected materials. It was felt that such a system would merely represent a form of taxation that would not lead to long term environmental improvements (OECD, 1998).

The implementation of EPR in Sweden was seen by some actors as an opportunity to partly overcome the municipal monopoly on waste management. Private waste management firms saw the introduction of producer responsibility as a business opportunity and have taken the view that the municipalities should only be involved in managing those wastes for which they bear legal responsibility. Echoing this perspective is the Swedish Competition Authority, a central government agency. The Authority indicates that the Local Government Act (SFS 1991:900) does not provide scope for municipalities to offer services provided by other organisations or state bodies unless there is specific direction from government to the contrary. In addition, concerning municipal corporations, the Authority notes that these organisations are only able to lawfully offer services within the respective jurisdictions of the municipal owners and that these companies are further restricted to offering services only to the concerned municipal owners. Consequently, the legal end-of-life management responsibility assigned to producers under Swedish EPR schemes excludes municipalities from offering their services to producers to collect and manage these materials (Sundbom, 2005).

The Swedish Competition Council, an industry advocacy organisation, takes a similar position and indicates that there is a significant likelihood of private waste sector legal action against local authorities that continue to engage in management of industrial, commercial and institutional (ICI) wastes, which include producer responsibility materials. However, given technicalities concerning the timing of the initiation of legal action in this regard no municipality has faced a legal challenge over its role under the producer responsibility systems to date (Cronhult, 2005). Further, should an action be initiated, the Competition Authority notes that municipalities would not necessarily be bound to comply with a court decision finding in favour of a private sector firm under present legislation (Sundbom, 2005).

In response to numerous and repeated complaints on the issue, Parliament issued a binding order in June 2005 that government draft legislation to clearly prohibit the public sector actors from competing in private markets under subsidised conditions. Since there are challenges in enforcing the limits on municipalities under the Local Government Act, the prohibition on 'public predatory pricing' is seen as one method to at least ensure that private and public actors will compete on an equal footing. Legalisation on the issue is anticipated in autumn, 2005 (Sundbom, 2005).

4 Description of the systems

Below the systems for wastepaper and packaging are profiled in terms of the elements described in the analytical framework described in Section 1 to provide a basis for investigating the role of the local governments under the producer responsibility systems in Sweden.

4.1 Wastepaper

Under the Ordinance on Producer Responsibility for Wastepaper (1994:1205) producers of newsprint, magazines, direct advertising material, telephone directories, mail order catalogues and similar printed materials are required to establish return collection systems across Sweden (SEPA, 2005c). Objectives of the Ordinance are to create a functioning paper recovery system, provide access to recycled fibre for Swedish paper mills, and provide incentives for rational and efficient wastepaper collection and management. The Ordinance prescribes a minimum 75 percent collection and recycling of wastepaper sold in Sweden from the year 2000 onward (SEPA, 2005c).

The Ordinance requires that producers ensure collected wastepaper is transported for environmentally sound disposal, which is deemed to mean recycling into paper or equivalent uses, except under exceptional circumstances. Recovery techniques such as ethanol generation, organic recycling or energy recovery are not deemed acceptable, nor are land-filling of separated collected wastepaper (SEPA, 2005c). In order to coordinate the fulfilment of these responsibilities, producers formed the Pressretur AB Producer Responsibility Organisation, referred to as a 'material company', to manage the collection and recycling system.

Since the collection of wastepaper by Pressretur is conducted under very similar conditions to that of packaging, the wastepaper system will be described in more detail below together with the packaging system to avoid repetition.

4.2 Packaging

The Ordinance on Producers' Responsibility for Packaging (1994:1236, amended as 1997:185) established a return-collection system for all packaging sold in Sweden, however additional requirements are imposed by complimentary legislation for metal cans or plastic bottles containing ready-to-serve beer and soft drinks. The Swedish EPA indicates that there are three main purposes of producer responsibility for packaging:

1. to influence design of packaging such that it can be reused or recovered with minimal environmental impact;

2. to ensure packaging is designed, produced and offered for sale such that environmentally sound management is possible at the end-of-life; and

3. to stimulate producers to develop packaging such that emissions of harmful substances are minimised during management of waste packaging (SEPA, 2005b).

The Packaging Ordinance defines a producer as any party that professionally manufactures imports or sells packaging or a product contained in packaging. Producers are required to provide return-collection facilities in consultation with municipalities, ensure their packaging is recoverable, which includes reuse, recycling and/or energy recovery, and report recovery rates

to the Swedish EPA annually (SEPA, 2005b). The Ordinance requires that packaging from all sources be collected and recycled or recovered by producers. The term 'recovery' as defined in the Ordinance includes activities such as incineration with energy recovery, composting or other forms of biological conversion.

The collection and recycling targets under the Packaging Ordinance effective 1997, 2001 and 2005 are outlined in Table 4-1.

Table 4-1 Packaging recycling and recovery requirements, % by weight

Packaging type	**1997***	**2001***	**2005****
Aluminum packaging other than for beverage containers	50%	70%	--
Metal packaging other than for beverage containers	--	--	70% recycling
Sheet steel	50%	70% recycling	--
Cardboard, paper and paperboard	30%	70% recovery, minimum 40% recycling	65% recycling combined to single target
Corrugated cardboard	65%	65% recycling	
Plastic other than PET beverage containers	30%	70% recovery, minimum 30% recycling	70% recovery, minimum 30% recycling
Glass	70% reuse or recycling	70% recycling	70% recycling
Wood	--	70% recovery, minimum 15% recycling	70% recovery, minimum 15% recycling
All other materials	--	30% recovery, minimum 15% recycling	30% recovery, minimum 15% recycling
Deposit-refund beverage containers			
Aluminum cans effective 1982	90%	90%	90%
Other metal cans	--	--	90% effective 1 January 2006
One-way PET Bottle effective 1991	90%	90%	90%
Other plastic bottles	--	--	90% effective 1 January 2006
Refillable glass for beer and soft drinks filled in Sweden	95% reuse	Reuse requirement repealed in 2001	--
Refillable glass for wine and spirits filled in Sweden	90% reuse	Reuse requirement repealed in 2001	--

** Source: REPA, 2005, English translation of Packaging Ordinance*
*** Source: SEPA, 2005b*

The deposit-refund system for beverage containers was established under the 1982 Act on Recycling of Aluminum Beverage Containers (1982:349), which required refundable deposits on soft drinks and beer sold in aluminium cans with a requirement that a minimum 90% of containers sold be recycled. In 1994 under Act on Certain Beverage Containers (1991:336) the system was expanded to include PET Bottles with the same recycling requirement as for aluminium cans (Returpack, 2005). Both these Acts were repealed in 2005 to be replaced by

the Ordinance on a Return System for Plastic Bottles and Metal Cans[4] (2005:220). Effective 1 January 2006 the Ordinance requires refundable deposits for ready-to-serve beverages sold in any type of plastic bottle or metal can for all beverages with the exception of dairy products and pure fruit juices.

To coordinate the deposit-refund system, trade organisations representing the packaging industry and the one-way PET bottle sectors jointly collaborate to operate AB Svenska Returpack/AB Svenska Returpack-PET respectively. Under the name 'Returpack', these organisations act in the role of PRO for the relevant beverage producers by coordinating the deposit-refund system and liaising with central government authorities respecting compliance and reporting. There is also an extensive refillable bottle system in Sweden which, by virtue of the value of the bottles, operates under a 'natural' deposit-refund system (Returpack, 2005).

For all other packaging that is not subject to the deposit-refund requirements, producers have formed separate not-for-profit PROs, referred to as 'material companies', which are tasked with meeting producers' responsibilities under the Packaging Ordinance. At the outset of the system in 1994, there were material companies representing each of the plastic, paperboard, corrugated cardboard, metal and glass packaging sectors (FTi, 2003). In 2004, the material companies for paperboard and corrugated cardboard merged to a single organisation. The material company for non-deposit glass packaging had been in operation on a voluntary basis managing glass packaging since the mid 1980's and continued to operate under the new statutory system (EEA, 1997).

When deciding how to best organise themselves to meet their obligations, producers saw the issue of strategic control over materials within the respective packaging material sector as paramount (Ankers, 2005a). Because there is competition between different packaging material types in the upstream packaging sector, the concerned packaging producers considered separate material companies as a means to enable each packaging material sector to retain control over the end-of-life management of packaging. The retail sector in particular sought to sustain competitive conditions between material types in the upstream packaging sector and supported a system based on multiple separate material companies (Ankers, 2005a).

The other organisations established by producers under the system are FTi -Förpacknings- och Tidningsinsamlingen (Packaging and Newspaper Collection), and REPA Registriet AB. FTi is a joint not-for-profit 'partner company' owned by the material companies to coordinate dealings with municipalities and establish Recycling Stations for consumers to deposit materials. REPA Registriet AB is a not-for-profit administrative body collecting packaging fees from producers selling products in plastic, metal and paper/cardboard packaging. For glass packaging, the material company for glass manages its affairs independent of REPA, although there is some coordination with the other packaging types through the FTi organisation.

The material companies and their respective owners are described in table 4-2.

[4] Förorderning om returnsystem för plastflaskor och metalburkar (2005:220). [Ordinance on a Return System for Plastic Bottles and Metal Cans] (2005:220). Translation by author.

Table 4-2 Swedish wastepaper and packaging material companies

Material Company	Ownership
1. **Returpack** – deposit-refund metal cans and plastic bottles for beverages.[5]	Packaging manufacturer Rexam (49%) The Swedish Brewers' Association (49%), retailers (2%)
2. **Plastkretsen AB** – plastic packaging[1]	Swedish Plastics Information Council (60%), Retailers & fillers (30%), Swedish Petroleum Institute (10%)
3. **Returkartong AB*** – paper-based packaging and corrugated cardboard.[2]	Association of Grocery Manufacturers of Sweden, Swedish Food Retailers Federation, Swedish Federation of Trade, Tetra Pak Sweden, Holmen AB, Korsnäs AB, AssiDomän Cartonboard AB, Elopak AB, Swedish Carton Packaging Association, Fiskeby Board AB, Stora Enso Skoghall AB, SCA Packaging Sweden AB, Kappa Kraftliner AB, Smurfit Holdings AB, Stora Enso Packaging AB
4. **Metallkretsen AB** – metal packaging (except deposit-refund cans)[3]	Metal packaging manufacturers (33%), Fillers (33%), Retailers (33%)
5. **GlasÅtervinning AB** – non-deposit-refund glass packaging.[4]	Packaging manufacturer Rexam (19,6%), Swedish Brewers' Association (18.8%), Swedish Spirits & Wine Suppliers' Association (18.8%), Swedish Food Federation (18.8%), Swedish Convenience Goods Trade Development Board (18.8%), LG Fredriksson Handels AB (5.1%)
6. **PressRetur AB** – newsprint, magazines, direct advertising material, telephone directories, mail order catalogues.[6]	Paper and forest products producers Holmen Paper AB (33.3%), SCA Forest Products AB (33.3%) and Stora Enso (33.3%)
7. FTi -Förpacknings- och Tidningsinsamlingen (Packaging and Newspaper Collection)	Joint not-for-profit 'partner company' owned by the material companies to coordinate dealings with municipalities and establish the Recycling Stations.
8. REPA Registriet AB	Not-for-profit administrative body collecting packaging fees from producers of plastic, metal and paper/cardboard packaging.

Source: 1. Plastkretsen, 2005, 2. Returkartong, 2005, 3. FTi, 2003, 4. GlasÅtervinning, 2005, 5. Returpack, 2005, 6. PressRetur, 2005

* note that Returkartong was formed in 2004 as a merger of Kartongåtervinning (paperboard) and Returwell (corrugated cardboard) and is now the material company for all cardboard and paper-based packaging.

According to the Swedish EPA, there is no requirement that a producer join one of the material companies, provided that an independent collection system is established (SEPA, 2005a). Some larger retail chains attempted to establish independent systems, however challenges of providing the required level of service nation-wide have to date proved insurmountable. Some 90% of packaging entering the market in Sweden is sold by producers that operate under one of the material companies. The remainder is mainly commercial packaging such as reusable plastic shipping containers which is managed independent of the material companies within the industry (Ankers, 2005a). There have been some discussions between producers respecting the formation of a plastic packaging material company which would offer producers an alternative to Plastkretsen, however it is unclear if this is at present a serious proposition (Ankers, 2005a).

4.3 Producer responsibility for wastepaper and packaging

Below the operation of the system for wastepaper and non deposit-refund packaging is described in the context of the analytical framework described in Section 1.

4.3.1 Collection

Physical management

Under the Wastepaper and Packaging Ordinances, producers have physical and financial responsibility for wastepaper and packaging and are required to provide a collection and recycling system in all Swedish municipalities. The legislation does not define the level of service that producers must provide and the system that developed ended up as a compromise between accessibility for consumers and accessibility for collectors. Producers developed some 7 500 Recycling Stations across Sweden, corresponding to one Recycling Station for each 1 200 residents (FTi, 2005 a). Consumers are responsible for sorting and transporting sorted wastepaper and packaging to Recycling Stations provided by producers (Mattsson, 2003). The stations are located in areas such as retail parking areas, gasoline stations or in neighbourhoods and the median distance from residential homes to Recycling Stations has been estimated at roughly 400 metres (FTi, 2001 in Mattsson, 2003).

The locations for Recycling Stations are determined by producers in consultation with the municipalities under so-called 'cooperation councils' which are to provide for a consultative forum between municipalities and producers respecting the collection systems. Since municipalities also bear responsibility for general municipal planning, which includes the issuance of building permits, they wield in effect veto power over producer proposed locations of these facilities. Given these powers, decisions by municipalities respecting recycling depot locations can be appealed by producers to the County Administrative Boards (Mattsson, 2003).

The material companies organise the collection and transportation of wastepaper and packaging through contracts with collection contractors, which are responsible for transporting materials collected from recycling stations in each municipality to authorised recovery firms, which also operate under agreements with the material companies (FTi, 2003). These collection contractors can be either private waste management firms or municipal waste management departments. Each material company will negotiate a separate collection contract with service providers and several different collection contractors commonly operate within a single municipality (Ankers, 2005a).

The majority of primary collection contracts are with private operators, however municipal waste management organisations are also engaged by the material companies. GlasÅtervinning has engaged the greatest number with fully 40% (117 of 289) of municipal collection contracts being with a municipal organisation, representing nearly 43% by population. Metallkretsen has a similarly high number of municipal organisations collecting under primary collection contracts at 34% (98) of municipalities, followed by Plastkretsen at 27% (78), Pressretur at 17% (48) and Returkatong at 7% (19). There are a very small number of public-private partnerships between municipalities and private operators, and these cases were counted under the municipal category. Primary collection entrepreneurs for each municipality at April, 2005 are listed in Appendix A.

Figure 4-1 illustrates primary collection contractors by municipality and type of organisation under contract by the material companies. The percentage of the Swedish population served by municipal collectors is indicated by the figures in brackets.

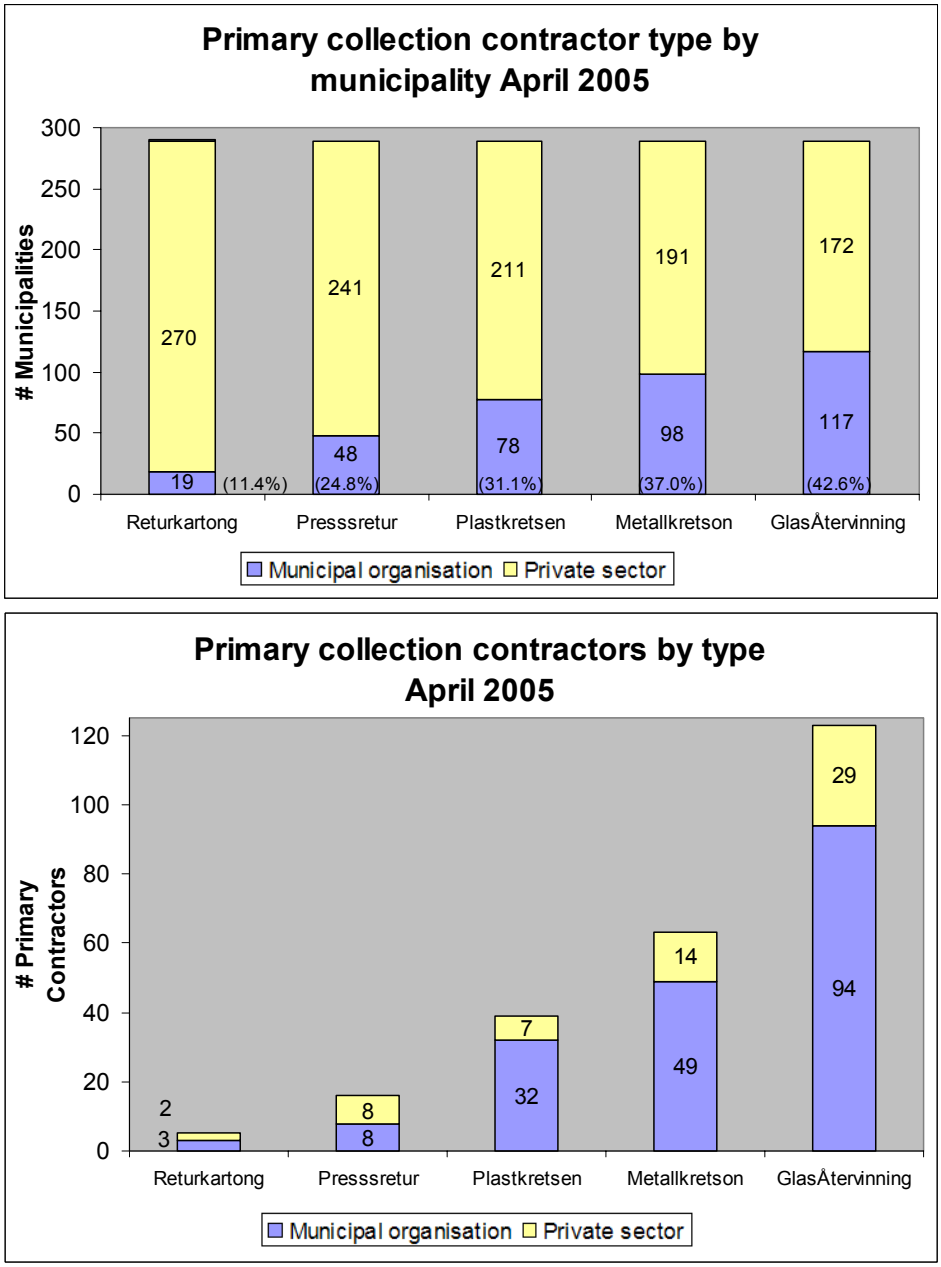


Figure 4-1 Primary collection contractors by type and municipality

Producers indicate that there are historical reasons behind the comparatively high number of municipal organisations contracting for glass. As early as the 1980's, municipalities have been source separating glass in cooperation with the glass industry and municipal investments made at that time have enabled municipalities to offer competitive bids for the current collection contracts. The a lesser extent, municipal investments toward metal collection efforts that pre-date the emergence of producer responsibility have also enabled municipalities to offer cost-competitive bids to the material companies (Ankers, 2005b). The main interest on the part of municipalities when collection of glass began was to reduce risks from work-related injuries caused by broken glass that is mixed with household waste, although concerns about effects of glass in incinerators was also a concern. Further, because of the history of cooperation GlasÅtervinning held a high degree of confidence in municipalities' capabilities and even discussed the potential for a general agreement for collection of glass packaging by municipalities.

The concern about effects on incinerators was also a motivation for municipalities to initiate source separation programs for metal packaging. However, municipalities indicate that for both metal and plastic packaging the material companies were unprepared to offer collection contracts generous enough to attract a significant interest on the part of private sector collectors (Audelius, 2005). For wastepaper and paper packaging, a small number of large private sector recyclers connected to the pulp and paper industry have won nearly all of the collection contracts with the material companies. Reasons for this include their national transportation infrastructure as well as paper sorting facilities that municipalities could not offer (Ankers, 2005b).

A significant problem at many Recycling Stations has been cleanliness and litter as well as the level of convenience for some groups in society given the required travel distances (SMSD, 2003). There have also been problems in many instances include the deposit of wastes and other materials that are not subject to producer responsibility requirements (Mattsson, 2003). The litter situation has been exacerbated by the delineation of responsibility for material collection to the material companies and their contractors and the station maintenance being managed by FTi.

To better coordinate the collection and maintenance of the Recycling Stations nine 'coordination companies' have been contracted by FTi to manage operations in 236 of Sweden's 289 municipalities. Effective January 1, 2005, the coordination companies are responsible for ensuring collection contractors efficiently and effectively collect materials from the Recycling Stations and also take responsibility for removing waste and litter. The 'coordination contractor' also is a contact point for municipalities and the public respecting the operation of the system (FTi, 2005 b). Where a 'coordination contractor' has not been engaged, the remaining municipalities are delivering the functions of the coordination company under agreements with FTi.

Respecting the efficacy of the waste separation efforts, composition studies of wastes sent for disposal by householders in two Swedish municipalities were undertaken by Mattsson and Berg in 2000. The studies found that source separation of producer responsibility wastepaper and packaging was far from complete with these materials representing between 46 and 52 percent of material sent for disposal by householders on a weight basis (Mattsson & Berg, 2000 in Mattsson, 2003). A similar study was performed by Vukicevic et al. in 2001 (Vukicevic, 2001 in Mattsson, 2003) which found a somewhat improved waste separation, mainly in the wastepaper and glass fractions, but still found over 30 percent by weight of disposed wastes were producer responsibility materials. The results of these studies are presented in table 4-3.

Table 4-3 Unsorted wastepaper and packaging in household waste, Sweden

Packaging type	**Percent by weight**[1]	**Percent by weight**[2]
Volume of weekly household waste destined for disposal	14.3 kg (single family) 10.4 kg (multi-family)	11.3 kg (single family) 7.4 kg (multi-family)
Wastepaper & paper packaging	28 – 32%	16.9%
Plastic packaging	8%	10%
Glass packaging	8 – 10%	2.9%
Metal packaging	2%	2.3%
Total	**46 – 52%**	**32.1%**

Source: (1) Mattsson & Berg, 2000, and (2) Vukicevic et al., 2001 in Mattsson, 2003

In its communication summarising the 2002 Eco-efficient Society Bill (2002/3:117), the central government indicated its intention that convenience be enhanced for consumers and that it considered collection facilities in the immediate vicinity of residences as a level of service to which consumers should be entitled (SMSD, 2003). Producers have indicated that they are not prepared to provide this level of service directly but will support the expansion of this collection by agreeing to accept wastepaper and packaging collected by private waste management firms. However, since producers do not pay all of the costs for this collection, building managers are required to purchase the collection service from the collection contractors and there is essentially a free market for offering these services. (Ankers, 2005a).

ICI consumers are provided with access to at least one free of charge Recycling Station within each municipality, however responsibility for transporting materials to the designated station rests with the ICI consumer (FTi, 2005 a). Similar to the collection from multi-family buildings, many ICI clients hire waste management contractors to collect on-site and this is a business area in which private waste management firms and municipal waste departments are active.

Financial mechanism

Construction of the network of Recycling Stations for wastepaper and packaging was financed through a number of mechanisms. In some cases producers, through FTi, financed construction of the stations and in others municipalities and/or collection contractors covered these costs as a component of negotiated collection contracts. For the containers at the Recycling Stations, collection contractors have in some cases paid the capital and maintenance costs which are recovered though special agreements for these costs or through the agreed price for collected materials delivered for recovery. Respecting the land for the Recycling Stations, the FTi generally does not own or pay rent costs, noting municipalities and other actors (e.g. retail shops seeking foot traffic) have an interest in providing land for the purpose of a station. Costs for maintenance manage matters such as snow and litter removal from the Recycling Stations are covered by FTi and service providers are contracted on an as required basis (Ankers, 2005a).

The implicit compromise in the collection system between convenience for consumers and accessibility for collectors has led to some criticism. One 1999 study by Marian Radetzki found that householders spend on average an extra 30 minutes per week to sort and transport wastepaper and packaging to Recycling Stations. Evaluating consumer time value for sorting and transportation, costs to consumers for their source separation efforts amounted to SEK 1 660 (€178) annually on a household basis. When adding these costs together with other system costs, Radetzki concluded that the recycling of wastepaper and packaging was an exceedingly unattractive proposal on economic grounds (Radetzki, 1999 in OECD, 2001). However, the EPA indicates that Swedish consumers have a strong environmental ethic and that if a time value of zero (e.g. hobby) is applied to the analysis the systems produce a positive economic result (Westen, 2005).

For collection directly from multi-family housing the material companies have agreed to establish payment rates for collected materials to support this type of collection by private contractors with a voluntary target of service to 75 percent of buildings in Sweden by 2006 (Strand, 2005). This collection is provided under an essentially free market for packaging, however the Pressretur system grants successful collection contractors exclusive rights to collection of all wastepaper within a municipality (Ydsten, 2005). To support the expansion of multi-family housing collection, the central government has agreed to provide funding support to building owners for up to 30 percent of material and labour costs to construct on-site

collection facilities for work undertaken between January 2005 and December 2006 to a maximum of SEK 100 000 (€10 700) (FTi, 2005).

There is no obligation on any party to provide on-site collection service however the expectation is that building managers will be interested in paying for this collection service to reduce general waste disposal costs and as a convenience to building residents. FTi estimates that efforts to increase the level of collection service at multi-family buildings have increased the coverage to some 50 percent of buildings (Strand, 2005). FTi indicates, however that meeting the 75 percent target will be challenging because of reluctance of major real estate owners who are not prepared to invest in building modifications. Other challenges include work environment legislation concerning lifting and equipment requirements for collection from confined spaces in buildings (Strand, 2005).

Collection from ICI consumers is similarly conducted under free market conditions although as previously noted, Pressretur grants a single collection contractor exclusive access to wastepaper from all sources within a municipality. For corrugated cardboard, there is sufficient value as a post-consumer commodity to drive collection entirely based on the value of the cardboard from ICI consumers. In these cases, collection contractors can generally collect corrugated cardboard from ICI consumers and transport the material to recyclers at a profit (FTi, 2003). There are also private arrangements between ICI consumers and their suppliers respecting reusable shipping packaging.

The Swedish EPA indicates that many municipalities have ambitions for the collection system that exceed what producers are providing and, responding to local political pressures, have acted locally to provide enhanced collection services. This has raised concerns on the part of private waste sector actors who complain that, as with other ICI wastes, municipalities are abusing their monopoly position over household waste in order to unfairly compete for collection contracts with the material companies (Ynger, 2005). While law exists that in principle should prevent this practice, the Swedish Competition Authority indicates that the current legislation does not empower effective regulation of municipal actors in this regard (Sundbom, 2005). As noted in Section3.5, legislation is anticipated in autumn, 2005 to clearly regulate the involvement of public sector actors in the marketplace and prohibit so called 'public predatory pricing' (Sundbom, 2005).

For packaging, producers are financing the system through fees paid by fillers of packaging to the material companies. Costs for the wastepaper system are covered directly by the paper industry owners of Pressretur. The fees cover costs associated with constructing and maintaining the Recycling Stations and transportation & recovery of collected materials. The fees are described in more detail under the *'Recovery'* section below.

Information management

Under the Packaging Ordinance, producers are required to consult with municipalities respecting the collection with the aim of coordinating their operations with the local waste management system. Producers are further required to provide municipalities with information about the packaging collection system and municipalities are in turn required to provide the relevant information to consumers about their role under the system (SEPA, 2005b).

To discharge their responsibility FTi-Förpacknings -och Tidningsinsamlingen (Packaging and Newspaper Collection) was tasked with coordination of the nation-wide network of Recycling Stations (FTi, 2005). This includes negotiating with municipalities respecting Recycling Station locations and providing information to consumers and municipalities regarding how to meet

the source separation obligations under the Ordinance. Plastkretsen, Returkartong, Metallkretsen and Pressretur are the principle owners of FTi, however GlasÅtervinning is also represented on the board of directors to enable coordinated efforts among all the material companies (FTi, 2003). Prior to November, 2004, the FTi organisation did not formally include wastepaper producers and was known simply as Förpackningsinsamlingen (Packaging Collection) (REPA 2004). FTi's role is restricted to the roles outlined above and it is the material companies that take responsibility for coordinating the collection from the Recycling Stations and the recycling/recovery of the collected materials.

Since 2004 municipalities have been assigned full responsibility for communication with householders respecting the wastepaper and packaging system and FTi is only responsible for providing sufficient information to the municipalities such that they can discharge their duty to inform local consumers (SMSD, 2003).

4.3.2 Recovery

Physical management

In its Annual Report for 2002, Förpackningsinsamlingen summarised the physical management of plastic, corrugated cardboard, paper and metal packaging (FTi, 2003). According to the report, plastic packaging, transport film from ICI sources and all rigid plastics are recycled into new products whereas soft plastics from households are incinerated with energy recovery. According to Plastkretsen, there are significant difficulties in removing contaminants from flexible plastic packaging, which makes this fraction more suited as a fuel for energy production (Plastkretsen, 2005). This processing takes place largely in Sweden, however a small amount of recycling takes place in other European countries.

For corrugated cardboard, over 90% of this material is collected from ICI sources and a majority of this cardboard is collected under contracts between ICI clients and private waste firms. Because of its smaller volume, corrugated cardboard from households is collected together with paper packaging and is transported by collection contractors to sorting plants, where it is in turn sent to paper mills for recycling (FTi, 2003). The demand for wastepaper in Sweden exceeds domestic supply and, according to the Swedish EPA, some half million tonnes of wastepaper are imported annually from other parts of Europe. This material, together with wastepaper collected domestically is recycled under the Pressretur system in a similar manner to corrugated cardboard, being largely recycled into new paper products at paper mills in Sweden (SEPA, 2005c).

For paper and paperboard packaging, the vast majority of this material is collected by the recyclers IL Recycling and Stena Scanpaper, which together have won the primary collection contracts for nearly all Swedish municipalities (FTi, 2003). The remainder are collected by the firm Sydåtervinning, a partnership corporation between the publicly owned SYSAV and IL Recycling, in the southernmost county of Skåne and a very small number of other collectors in other parts of Sweden (FTi, 2003). Collected materials are recycled in two Swedish mills into new paper products including packaging.

For metal packaging, material collected from householders at the Recycling Stations as well as that from ICI consumers is consolidated at staging points across Sweden prior to shipping to one of six sorting facilities which separate steel and aluminium and compress the material for sale to metal smelters in Sweden and Germany for recycling (FTi, 2003).

Recycling glass packaging, the SGÅ Glassworks in the city of Närke in the demographic centre of Sweden is the only glass recycling plant in Sweden (Johansson, 2005).

Financial mechanism

Because the collection and recycling system is not self-financing based on the value of the recovered materials, additional financing is required to drive the collection and recovery. In the case of plastic, metal and paper/cardboard packaging, the material companies Plastkretsen, Returkartong and Metallkretsen formed a joint subsidiary company Reparegistret AB (REPA), as a not-for-profit administrative body for producers which are members of these material companies. The functions of REPA are to monitor sales of producers and administer fees paid by producers that are in turn utilised by the material companies to meet the producers' responsibilities respecting collection and recycling (REPA, 2005 a). For producers selling in glass packaging, fees are paid directly to the material company GlasÅtervinning, which administers both the collection of fees as well as the operation of the collection and recycling system. For producers of wastepaper (newsprint, print advertising, telephone directories etc.), the owners of the material company Pressretur cover all system costs directly on behalf of producers (REPA, 2005 a).

Fees paid by producers to meet their responsibilities are outlined on table 4-4.

Table 4-4 Swedish wastepaper and packaging fees at 2005 April 1

Packaging	**Fee**
Metals (aluminium & steel plate cans >16cm diameter)	SEK 0.60/kg (€0.063)
Metals (aluminium & steel plate, other packaging)	SEK 1.20/kg (€0.127)
Metals (drums)	SEK 0.06/kg (€0.063)
Cardboard/paper packaging	SEK 0.45 (€0.047)
Cardboard/paper packaging (industrial packaging)	SEK 0.02/kg (€0.002)
Corrugated cardboard	SEK 0.02 – 0.75/kg (€0.002 – 0.079) depending on industry sector
Plastics (carrier bags)	SEK 1.50/kg
Plastics (foamed and other plastic)	SEK 2.00/kg
Glass[1]	0-250 ml SEK 0.07 per unit (€0.0074) 251-500 ml SEK 0.15 per unit (€0.016) 501-699 ml SEK 0.19 per unit (€0.020) >700 ml SEK 0.28 per unit (€0.030)
Wastepaper[2] (newsprint, print advertising, telephone directories etc.)	No fee paid by producers, all costs covered by owners of Pressretur directly.

Source: Modified from REPA, 2005b, except for (1) Johansson, 2005, (2) Nilsson, 2005

To simplify administration, producers with an annual turnover of less than SEK 0.5 million (€53 000) are not required by the material companies to pay packaging fees and their responsibilities under the Ordinance are carried out by the remainder of the industry (REPA, 2005 a). Similarly, re-useable shipping packaging such as plastic crates are entirely managed between sellers and customers and fees are not required to be paid to the material companies (Ankers, 2005a).

Information management

Under the Packaging Ordinance, producers have an obligation to report recycling statistics to the Swedish EPA for the purpose of demonstrating that the prescribed targets are being achieved as well as to the municipalities, who in turn report information to local consumers. To demonstrate the achievement of the recovery targets, it is the material companies that provide this information to the Swedish EPA on an annual basis (Fredriksson, 2005). It is FTi that provides information to municipalities via its internet website respecting the results of source separation at the local level and municipalities in turn have a responsibility to inform consumers. Importantly, FTi indicates that for some smaller municipalities results are reported based on regional collection statistics that have been apportioned on a per-capita basis among the municipalities in question (FTi, 2005).

National results for the collection and management of wastepaper and packaging are reported in annual reports by the EPA to the public on the producer responsibility systems. With respect to these results, EPA indicates that there is a degree of uncertainty in the figures as an unknown number of companies are complying independently. Bearing these issues in mind, the EPA reports that overall recycling of packaging in 2004 was 49% and overall recovery was 58% of materials placed on the market. However, only glass and paper packaging and wastepaper were able to fully achieve the targets prescribed in their respective ordinances (SEPA, 2005d). At 80% recycling for 2004 wastepaper exceeded the 75% minimum recycling target prescribed in the Ordinance.

Results for packaging recycling as reported by the EPA are presented in figure 4-2.

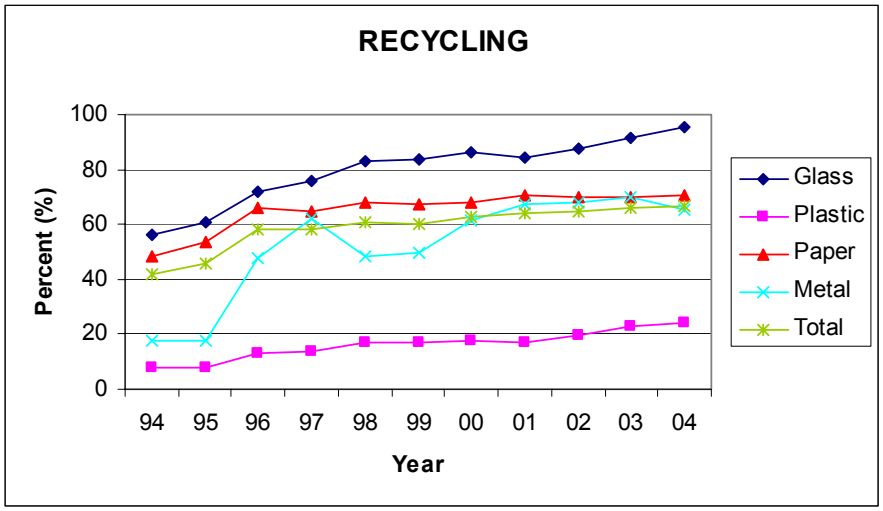


Figure 4-2 Swedish packaging recycling

Source: SEPA, 2005c

From the perspective of waste prevention, it is noteworthy that with nearly 50% growth in retail turnover between 1995 and 2004, single-use packaging placed on the market as reported by the EPA increased by less than half that amount overall and just 6% since 1999. Figure 4-3 illustrates retail trade sales and non-refillable packaging placed on the market as reported by the Swedish EPA.

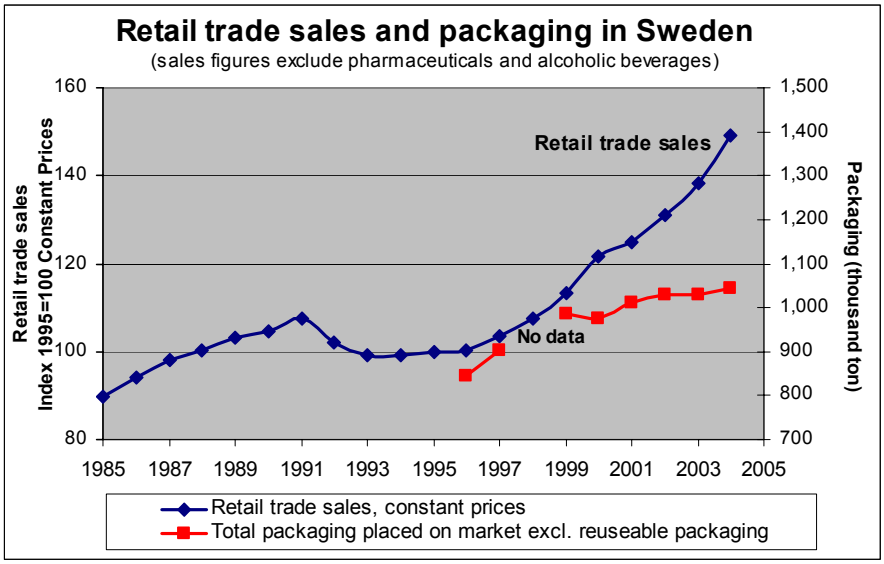


Figure 4-3 Retail trade sales and packaging in Sweden

Source: Retail sales modified from SCB Statistics Sweden, 2005 b.
Packaging data SEPA, 2005 d

4.3.3 Monitoring & Enforcement

Via the reports submitted by the material companies, the EPA monitors performance of the wastepaper and packaging systems at the national level, whereas formal enforcement authority for the Wastepaper and Packaging Ordinances rests at the municipal level. Accordingly, any enforcement action against a non-compliant producer would be taken by municipal environmental enforcement authorities (Jacobbson, 2005). The municipalities ensure that producers fulfil their consultation duty with municipalities, provide suitable collection systems as well as provide information to municipalities as required concerning consumer requirements under the system.

Unsurprisingly, with 289 separate municipal enforcement bodies there has been a lack of consistency respecting the enforcement of the Ordinance. To address this issue the Swedish EPA anticipates releasing guidelines are anticipated in autumn 2005 to clarify matters for municipal enforcement officials (Jacobsson, 2005). The EPA further notes that despite the compulsory nature of the Wastepaper and Packaging Ordinances, authorities have no statutory sanction at their disposal to enforce the legislation. Nonetheless, there are non-statutory measures which are considered an effective deterrent and it is noted that cultural factors in Sweden have thus far created strong market incentives for compliance among producers (Jacobsson, 2005).

Concerning compliance, the Swedish EPA undertook to monitor the marketplace in the late 1990s for 'free riders' and found non-compliance to be very limited and only among very small producers (Fredriksson, 2005 b). Given the commercial interests of its members, the REPA organisation also undertakes to monitor the marketplace and advise potential 'producers' which could be free riders of their obligations. Also, because of a desire to project an environmentally friendly image, major food retailers in Sweden have encouraged compliance with the system by requiring all suppliers to be registered under the REPA system (EEA, 1997).

Additionally, it is the municipal environmental authorities that take responsibility for ensuring that consumers fulfil their duty to sort and transport wastes as required and that litter and other inappropriate materials are not deposited at Recycling Stations, although there is in reality limited capacity to enforce the waste sorting requirement on householders. As producers have an interest in the quality of sorted materials and reducing deposit of inappropriate materials at Recycling Stations they have begun targeted surveillance of problematic Recycling Stations to identify and report individuals disposing inappropriate wastes at the stations (Fredriksson, 2005 a).

4.4 Summary

For wastepaper and packaging, producers are required to provide a return collection system across all of Sweden and to recover wastepaper and packaging according to prescribed recovery targets. Producers are also required to consult with municipalities respecting the collection facilities and provide information to municipalities which are in turn required to inform consumers respecting the collection and recycling system. Consumers have a duty to separate wastepaper and packaging and transport these materials to Recycling Stations provided by producers. Although the EPA plays a role in monitoring the performance of producers in meeting recovery targets, it is the municipalities that hold all formal enforcement authority. This enforcement role includes ensuring producers fulfil their duty to consult with municipalities, provide information and operate a suitable return collection system and ensuring that consumers meet their source separation duties.

Producers have organised themselves by establishing PROs known as 'material companies', which take responsibility for collection and management of wastepaper and packaging on a material by material basis. The material companies are Plastkretsen (plastic packaging), Metallkretsen (metal packaging), Returkartong (paper packaging), GlasÅtervinning (non-deposit-refund glass packaging), and Pressretur (wastepaper - newspapers, magazines, advertising materials, telephone directories etc.). Each material company takes responsibility for collection and management their respective material type independently and within each municipality several contractors are commonly collecting the various material types under collection contracts. Reasons behind the separate management of each packaging material type were an interest on the part of the concerned producers to maintain a strategic control over the management of each material type. Collection systems for wastepaper and packaging that have been developed are:

- **Recycling Stations** – where consumers can deposit sorted wastepaper and packaging. Presently there are some 7 500 stations in Sweden, with the median distance from households being 400 metres. Complaints have been expressed respecting cleanliness and poor convenience for the stations. The material companies contract with either private waste management firms or municipal waste departments to collect materials from the stations and deliver to recovery firms.

- Collection from **multi-family housing** is also being developed, although the collection is not fully financed by producers. Building owners hire collection contractors for this type of collection as a convenience for tenants and there is a generally free market for this type of collection. Producers have agreed to a voluntary target of serving 75 percent of multi-family housing units with this type of collection by 2006. Both private waste management firms and municipal waste management departments are active in this business.

- **Curb-side** collection from single family housing is provided in a very limited number of instances, although costs are perceived to be very high for this service. As with collection from multi-family buildings, producers do not take responsibility for and are not planning to initiate collection from curb-side.

- Collection from **ICI sources** is provided through at least one Recycling Station being available in each municipality at no cost, although the generator of the wastepaper and packaging remains responsible for arranging transportation costs. In practice many ICI consumers engage private waste collection contractors for collection and there is a largely free market for this service on the part of collection contractors.

Recycling and recovery targets under the Wastepaper and Packaging Ordinances have been achieved for wastepaper and glass & paper packaging, while target shave not been met for the other material types, particularly plastic. An overall summary illustrating the operation of the Swedish EPR systems for wastepaper and packaging is depicted in Figure 4-4.

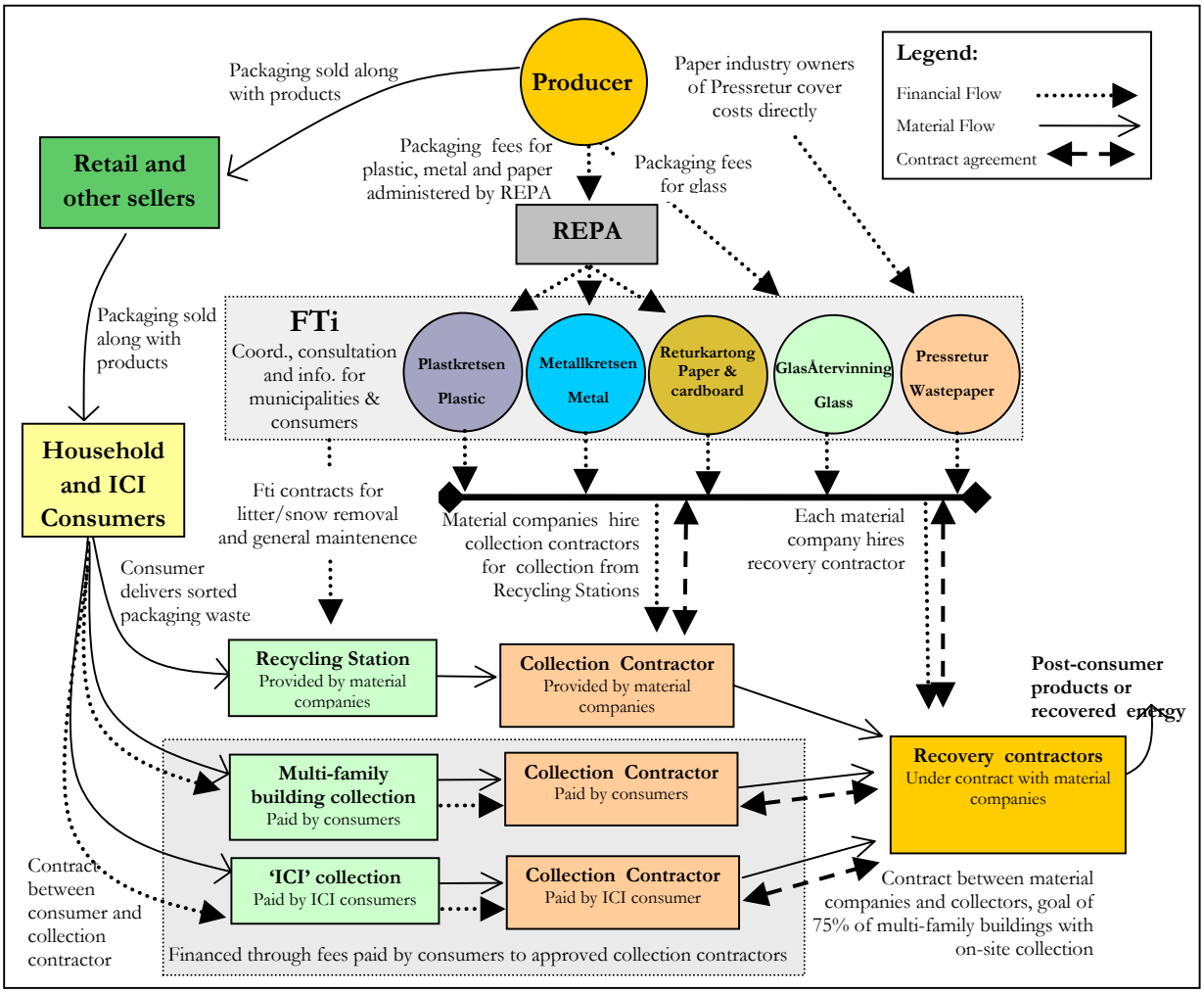


Figure 4-4 Swedish packaging and wastepaper collection system

Source: Modified from REPA, 2005a

5 Local Implementation Case Studies

The following cases attempt to profile the local implementation of the producer responsibility systems within four municipalities. The purpose of this section is to explore how the system has functioned in four municipalities where the municipal waste management organisation has participated under the systems. As a basis for comparison, one municipality is profiled where private waste management firms are working under contract with the material companies and the municipality is involved only for enforcement and information roles as required by law.

5.1 Case #1 Municipality of Lund

5.1.1 Background[5]

The Municipality of Lund is located in Sweden's southernmost County of Skåne. At 31 December 2004 Lund's population was 101 423 residents. Within the Lund municipal boundary lie the villages of Södra Sandby, Dalby, Veberöd, Genarp and a number of other smaller settlements, for which Lund bears municipal responsibilities. The municipality estimates that roughly 65% of Lund's population resides in multi-family housing and the remainder in single family homes.

The Lund Sanitation Department (Lund Renhålningsverk, hereafter referred to as 'LRV') is a is responsible for solid waste management in Lund. LRV is a department of the Municipality of Lund and is accountable directly to the City Council. The City Council requires that LRV be self-financing based on fees and charges and no subsidies from taxpayers can be provided.

5.1.2 Emergence of Producer Responsibility in Lund

In the early 1980's LRV began a source separation program to collect and recycle glass and newsprint at a number of municipally owned and operated collection stations. The objectives of this program were to reduce waste disposal costs as well as improve the environmental performance of the city's waste management system. With the implementation of producer responsibility in 1994, the political direction in Lund was that the LRV prepare bids for the packaging and wastepaper collection contracts in Lund. The rationale behind this direction was that the municipality wanted to be assured of good performance of the collection system given a very strong local environmental ethic and interest, both at the political level and among the city residents. Other reasons were several years experience collecting paper and glass, the municipal infrastructure that was already developed under the earlier programs and a perceived need to limit heavy vehicle traffic from up to five separate collection contractors collecting different fractions in Lund. A final rationale was the ambition to be able to coordinate the collection of wastepaper and packaging together with the other fractions of household waste for which the municipality remained responsible.

Because of commercial confidentiality reasons, LRV indicates that it is unable to provide specific information respecting revenues and expenditures for the producer responsibility contracts. Concerning financing of its overall operations, LRV indicates that overall revenues from fees and collection contracts for all services meet overall costs, a precise cost and

[5] Except where noted, the information presented in the case study is based on in-depth personal interviews with Göthe, Anna Wilhelmsson and Kristensen, Johnny, both of Lund Sanitation Department.

revenue allocation between the contracts under the producer responsibility systems and the other aspects of LRV's operations are challenging.

In 1996 when collection from the Recycling Station network began in Lund under the producer responsibility systems, LRV had won the collection contracts from Metallkretsen and GlasÅtervinning. The collection contract with Plastkretsen was won by the private firm Ragn-Sells AB and the Returwell and Kartongåtevinning contracts were won by the firm Sydåtervinning, a public-private partnership between the publicly owned firm SYSAV and IL-Recycling. Given that LRV did not win the primary collection contracts with Plastkretsen, Returwell and Kartongåtervinning, LRV initiated negotiations with the successful collection contractors to serve in the capacity as collection subcontractor. In 2003 the primary collection contract for Plastkretsen was awarded to LRV.

5.1.3 Collection infrastructure

Recycling Stations

There are 18 **Recycling Stations** located in the main Lund municipality and a further 7 in smaller settlements within the municipal boundary. LRV strives to provide at least one Recycling Station within 400 metres of all residential addresses within the municipal boundary. However, this has proven a difficult target to achieve in the densely populated urban centre of Lund where station distances are in the order of 600 metres as well as in the outlying settlements, where distances can be considerably greater.

Under the agreement between FTi and LRV, **construction costs** for the Recycling Centres were shared between the two parties however LRV was responsible for a majority of costs. LRV also agreed to secured access to land for the network of Recycling Stations, however where ground preparation (paving, access driveway etc.) is required, FTi agreed to cover these costs. Roughly half of the Recycling Stations are located on land previously owned by the City and the remainder are on land offered at no cost by property owners with private interests in providing the land (e.g. in retail parking lots). **Operation and maintenance** costs such as repainting and building permits are the responsibility of LRV. Litter removal is also conducted by LRV under contract to FTi, however LRV considers the agreement to be insufficient to cover actual costs for an adequate level of service.

Given the political direction that LRV operate the collection system for wastepaper and packaging in Lund, LRV saw a strategic interest in retaining ownership of the collection infrastructure. It was felt that this ownership would provide an advantageous negotiating position with producers, particularly respecting metal, paper and clear glass for which there are good private markets in Sweden independent of the producer responsibility systems.

LRV takes an active interest in monitoring the Recycling Stations to reduce litter and the deposit of inappropriate materials because of its financial interest in maintaining high quality of sorted material. Consumers depositing litter or other inappropriate materials are reported to the Lund municipality environmental enforcement authority, which is an administratively separate organisation.

Multi-family housing

For collection from multi-family housing, LRV indicates that approximately 70% of **multi-family residences** in Lund are provided with collection service on-site and LRV is the provider of service for all but a very small number of these buildings. LRV indicates that because of the convenience for consumers a substantial majority, exceeding two thirds by weight, of wastepaper and packaging collected in Lund is collected from these sources while

only a minority is collected at the Recycling Stations. Further, the collection from multi-family buildings is notable in that the sorting effort on behalf of consumers is both more complete, with higher quantities of collected material, and of higher quality with reduced contaminants. LRV charges building managers a standard fee which depends on the size of collection bin and frequency of pick-up.

Single-family housing

For consumers living in single-family residences, LRV began a **curb-side collection** service to collect sorted packaging and wastepaper alongside household waste and other sorted waste fractions. This collection project was initiated in 1998/99 with the objective of developing a compartmentalised bin collection system with a matching collection vehicle for parallel collection of all sorted waste at curb-side. The project is presently offered to roughly 3 000 single-family residences out of a total 12 000 in Lund. There are plans to expand the curb-side collection service to a further 2 000 homes, however improvements to the vehicle's hydraulic lift system need to be completed prior to the planned expansion. As with the collection from multi-family buildings, LRV notes that there is a more complete sorting and a higher quality material stream from materials collected at curb-side from single-family.

Development of the system has been a major project for LRV and has cost roughly SEK 13 million (€1,377,000) over a six year period. These costs have been financed through increased collection fees for household waste disposal in addition to research and development grants from various sources. LRV indicates that, while the system has been costly, it is believed to offer long run cost savings for waste collection from single family housing. To support this and the other programs offered, LRV indicates that the base household waste disposal fees in Lund are presently the highest in the region.

ICI Consumers

There is a free market for collection of wastepaper and packaging from **ICI consumers** and both LRV and private waste management firms are active in this market. LRV actively pursues collection contracts for packaging and wastepaper in tandem with collection of other municipal type wastes from these sources. For larger businesses, LRV indicates that it has won collection contracts for an un-quantified but believed to be substantial majority of these businesses as well as nearly all small businesses in Lund, given that private collection contractors are not interested in serving these smaller sources. Fees for collection of wastepaper and packaging from ICI sources are priced identically to the collection from multi-family housing.

The return collection facilities in Lund are summarised in Table 5-1.

Table 5-1 LRV collection systems for wastepaper and packaging

Wastepaper and packaging collection type	# in main Lund Municipality	# in smaller settlements	Financing mechanism
Recycling station	18	7	Land preparation (paving) costs paid by material companies. Land provided by LRV or private landowner at no cost. Recycling bin capital costs shared between material companies and LRV. RV responsible for operation and maintenance costs.
Multi-family	70% of multi-family housing		Negotiated between property owner and collection

Wastepaper and packaging collection type	# in main Lund Municipality	# in smaller settlements	Financing mechanism
housing collection	units served with on-site collection, nearly all of these served by LRV		contractor. For collection by LRV fees are charged on the basis of size of container and frequency of pick-up.
Single family curb-side collection	3 000 of 12 000 single family homes with curb-side collection		Annual standard fee paid by household consumers to LRV for collection at curb-side, where available.
ICI collection	Un-quantified but substantial majority of large ICI consumers and nearly all small ICI consumers		Free market for negotiation between collection contractors and ICI consumers. Contractors require agreement with material companies.

5.1.4 Operation of the collection system

From 1996 to 2003, the firm Ragn-Sells AB held the primary collection contract for the **Plastkretsen** system and LRV collected as a subcontractor. LRV indicates that under that agreement, payment was based on quality of source separation and Ragn-Sells would frequently refuse payment outright based on claimed poor quality source separation thus forcing LRV to fully cover the collection costs from other revenue sources. Given its interest in being the exclusive collection contractor in Lund, LRV was very motivated to win the contract for collection under the Plastkretsen system, and in 2004 based on a cost competitive bid LRV became the primary collection contractor. Despite the low contract price with Plastkretsen, LRV indicates that revenues are considerably greater than previously as a subcontractor with Ragn-Sells. A rather dramatic increase in plastic collection and recycling can be seen over the period 2002 – 2004 in table 5-3 below which is a reflection of the quantity of material that was not was not accepted under the previous sub-contract agreement.

Under the current Plastkretsen agreement, LRV is responsible for transporting plastic packaging to a regional consolidation facility some 20 km to the north where the plastic is graded and sent to various recovery firms. Shipments from Lund are graded into three classes, which form a basis for payment under their contract. The top grade 'A' has never been awarded, while material graded as mid quality 'B' is granted for 70-80% of shipments with the remainder as lowest grade 'C'. Nonetheless, it is estimated that the fees paid under even the lowest grade meet costs of collection by LRV.

Under LRV's subcontract agreement for paper-based packaging and wastepaper, materials LRV is responsible for transporting materials to the primary **Returkartong & Pressretur** collection contractor, Sydåtervinning, some 20 km to the south. Shipped materials are graded, sorted and further shipped to paper mills. LRV is paid for collected material on the basis of the quality of the sorted material and payment can be reduced by 25 percent and at times as much as 50 percent based on poor quality of source separation. According to LRV, revenues received as a subcontractor are reduced by roughly 20 percent generally relative to what would be received as a primary collection contractor. Nonetheless, the revenues received from this activity are believed to cover costs to LRV for collection.

Metal packaging collected under the **Metallkretsen** contract is transported to an LRV facility for pre-sorting and compressing before being graded and collected on-site by a Metallkretsen recycler. Responsibility for disposing contaminants sorted from the metal packaging stream rests with LRV. Because of the high quality sorting effort by LRV, payment received from

Metallkretsen generally exceeds the amount in the original contract agreement and is believed to easily meet the costs of collection and sorting. LRV indicates that even under the lowest grade of quality (e.g. completely unsorted), revenues would meet collection costs.

The agreement with **GlasÅtervinning** for glass packaging also issues payment based on quality of the material sorting, both with respect to clear and coloured glass fractions but also respecting the presence of non-packaging glass materials and other contaminants. LRV conducts minor quality checks and removes contaminants as required prior to collection by GlasÅtervinning on-site in Lund for transport to the SGÅ Glassworks in the city of Närke, located in the demographic centre of Sweden.

Table 5-2 summarises the financial arrangements for the collection of wastepaper & packaging in Lund.

Table 5-2 Producer responsibility material processors, Lund

Material Company	**Primary collection contractor**	**Pre sorting/treatment**	**Recycling contractor**
Plastkretsen (plastic packaging)	LRV	No pre-sorting or treatment prior to shipping.	Lund Sanitation Department transports collected plastic packaging to Plastkretsen consolidation facility. Payment based on purity of sorted material, graded in quality as A, B or C.
Metallkretsen (metal packaging)	LRV	LRV pre-sorts to remove contaminants & compress to increase density at LRV facility.	Metallkretsen arranges on-site collection at LRV sorting facility in Lund. Payment based on purity of sorted material.
GlasÅtervinning (non-deposit-refund glass packaging)	LRV	Minor quality check prior to shipping and pre-sort on as-needed basis to maintain quality	GlasÅtervinning arranges transportation from LRV to SGÅ Glassworks, in Närke Payment based on purity of sorted material.
Returkartong (paper-based packaging and corrugated cardboard)	Sydåtervinning (LRV under sub-contract)	No pre-sorting or treatment prior to shipping.	Lund Sanitation Department transports collected paper packaging to primary collection contractor where material is graded, further sorted and shipped to paper mills. Payment based on purity of sorted material, but LRV receives some 20% less payment as a subcontractor than otherwise as primary contractor.
Pressretur (wastepaper)	Sydåtervinning (LRV under sub-contract)	No pre-sorting or treatment prior to shipping.	LRV transports collected wastepaper to Sydåtervinning in Malmö where the material is graded, further sorted and shipped to paper mills. Payment based on purity of sorted material, but LRV receives some 20% less payment as a subcontractor than otherwise as primary contractor.

In general terms LRV expressed an opinion that it strongly prefers the negotiation of a single collection contract for all of the material fractions rather than competing individually for each collection contract with each of the material companies.

5.1.5 Information and reporting

LRV takes primary responsibility for providing Lund's citizens with information respecting the source separation and recycling system as a component of its annual report, which also reports on the general waste management system in Lund in considerable detail. The report is available free of charge in hard copy and via the Lund internet webpage.

There are also significant information efforts in the form of an internet website and environmental themed calendars with waste sorting information distributed free of charge. Until 2004 FTi provided financial support for LRV's communication efforts in the form of sponsorship advertising on printed materials. This support amounted to roughly SEK 100 000 (€10 600) annually representing some 20% of total LRV communications costs for the waste separation and recycling system. After 2004 future costs for informing consumers will rest entirely with LRV.

In addition to the LRV annual report FTi also publishes packaging collection statistics on a per-capita basis, and Pressretur publishes per-capita and total wastepaper collection statistics for Lund. By projecting the per-capita packaging collection figures as reported by FTi based on municipal population, substantial differences in the data are evident. LRV indicates that these differences cannot be explained and that to date a significant amount of work has been done to attempt to resolve the differences. For corrugated cardboard, LRV speculates that one possible explanation for the very large difference in figures could be manufacturing scraps from local major packaging manufacturers are ending up counted under the collection figures.

Table 5-3 summarises quantities of wastepaper and packaging collected and recycled in Lund for the period 1998 – 2004 as reported by LRV and by producers for 2004.

Table 5-3 Wastepaper and packaging collection, 1998 – 2004, Lund

	Reported by LRV							Reported by Producers for 2004[1]	
Ton	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**kg per-capita**	**Projected total (ton)**
Wastepaper	9 061	8 403	8 321	8 245	8 297	7 797	8 225	83[2]	8265[2]
Corrugated cardboard	854	1 631	1 989	2 042	2 126	2 007	2 080	76.31	7 739.6
Paperboard	449	680	606	655	555	809	1 088	12.31	1 248.5
Glass	1 733	1 914	1 914	1 833	1 944	1 893	2 009	19.8	2 008.2
Plastic	110	154	156	174	105	183	198	1.84	186.6 (excl. ICI)
Metal	102	97	95	157	193	159	158	3.29	333.7

Source: Lund Sanitation Department Annual Report, 2004 (Lunds Renhålningsverk Årsbetättesle, 2004) except (1) FTi, 2005 and (2) Pressretur, 2005

5.2 Case #2 Municipality of Halmstad

5.2.1 Background[6]

The Municipality of Halmstad is a port city located on Sweden's west coast in the County of Halland. At 31 December 2004, Halmstad's population was 87 929 residents. Within the Halmstad municipal boundary lie the villages of Stenninge, Getinge, Kvibille, Oskarström, Simlångsdalen and several other smaller settlements for which Halmstad bears municipal responsibilities. Roughly half of Halmsad's residents reside in multi-family residences and the remainder in single-family homes.

The Halmstad Sanitation Corporation (Halmstads Renhållnings AB, hereafter referred to as HAB) is a municipal corporation wholly owned by the Municipality of Halmstad. HAB was formed in 1974 when the Halmstad amalgamated with the surrounding settlements into a singe municipality. As a municipal corporation, HAB is required to be entirely self-financing based on fees charged for its services to clients which include both private households and ICI clients.

In 1971 a waste incinerator was build in Halmstad as a means of disposing waste in the region. Today, HAB operates a modern incinerator which accepts wastes from households and industries in Halmstad as well as waste from as far away as Germany and other European countries. Energy is recovered from waste in the form of electricity and heat, which is distributed through a district heating system in the municipality and can meet some 80% of the municipal demand for hot water.

5.2.2 Emergence of Producer Responsibility in Halmstad

In the early 1990s HAB began a source separation program to collect and recycle glass and newsprint at collection stations owned and operated entirely by HAB. There were 90 collection stations in the municipality which provided at least one station within 500 metres from all residential households. In addition, newsprint could be easily recycled by a nearby paper mill. There was a perception among the municipality that the system operated very smoothly and provided a satisfactory level of convenience to residents.

During the discussions between HAB and the producers at the outset of producer responsibility in Halmstad, producers took the position that all the stations should accept every material fraction, which necessitated a reduction in the total number due to space constraints. With respect to the decision to compete for collection contracts with the material companies, HAB took the view that its role is to serve the interests and needs of its municipal owners. In this respect, there was and remains a view that HAB is better placed to effectively collect materials than private contractors. In addition, HAB had considerable experience collecting materials in the municipality and could apply existing collection equipment to the expanded collection system. Further in support of its role, HAB indicates that it considers the issue of local coordination as very important for an effective system, noting that consumers are looking for a simple and convenient system for all their waste management needs.

[6] Except where noted, the information presented in the case study is based on in-depth personal interviews with Ålund, Per, and Sjölin, Greta, both of Halmstads Renhållnings AB

In the mid 1990's when collection of packaging and wastepaper began under the producer responsibility systems in Halmstad, HAB had won the primary collection contracts for the Recycling Stations with Metallkretsen, Plastkretsen, and GlasÅtervinning. The collection contracts for Returwell (corrugated cardboard), Kartongåtevinning (paper-based packaging) the predecessors of Returkartong, and Pressretur were won by the private firm Stena Scanpaper AB, which was able to offer paper sorting capabilities which were of interest to the material companies. HAB negotiated a collection sub-contract agreement with Stena, which was interested in a local collector as they did not possess sufficient collection vehicles in the region, which could be provided by HAB from existing resources.

5.2.3 Collection infrastructure

Recycling Stations

There are presently 53 **Recycling Stations** in the main Halmstad municipality and 20 in the smaller outlying villages within the municipal boundary for a total of 73. The present number of Recycling Stations was reduced from the original 90 that were developed for newsprint and glass due to space constraints. The present number of Recycling Stations is one per 1 200 residents in Halmstad. HAB indicates that even with the current reduced number of stations the material companies maintain the position that the number could be reduced further without significant impact on the system performance. A significant problem at the Recycling Stations in Halmstad has been snow removal in winter, which has caused difficulties for service vehicles to access containers leading to overfilling and litter problems.

Construction of the original network of Recycling Stations and the additional containers required for the new materials collected under the producer responsibility systems was financed entirely by HAB. Land for the stations is provided free of charge by the municipality and by private landowners with an interest in attracting consumer foot traffic (e.g. retail parking lots) and HAB took responsibility for negotiations with landowners for all required land. **Operation and maintenance** costs for the recycling stations are the responsibility of HAB. HAB presently has a contract agreement with FTi for litter removal, however the contract amount is believed to cover in the order of 5 percent of actual costs to provide a level of service considered as adequate. HAB also commented that it perceives that producers consider the issue of litter removal a matter for municipalities to handle rather than one of primary concern for producers.

HAB notes that the problem of litter is worse in summer months and that it at one time operated a formal monitoring program at stations considered to be particularly problematic. HAB also notes that persistent litter problems forced the closure of three of its stations in the past.

Multi-family housing

For collection from multi-family buildings HAB indicates that roughly 70% of multi-family residences in Halmstad are provided with this service. HAB is presently the single provider of this collection service and notes that private waste management firms are not interested in serving the Halmstad market because of barriers posed by the current large market share enjoyed by HAB. HAB notes that the quality of source separation by consumers in multi-family buildings does not differ substantially from that at the Recycling Stations.

Respecting the pricing of collection from multi-family buildings, HAB has a standard fee for which building owners pay for collection based on each material type however the cost increases if there are access constraints for collection vehicles. Where there are significant

quality issues with the source separation of paper or plastics, HAB sends containers for incineration as household waste and bills the building owner accordingly.

There is no curb-side collection service offered to single-family residences in Halmstad.

ICI Consumers
There is a free market for collection of wastepaper and packaging from **ICI consumers** and both HAB and private waste management firms are active in this market. HAB indicates that there is intensive competition in the ICI sector in Halmstad for plastics, for which HAB indicates it has won a market share of no more than 25%. By virtue of its primary collection contract with Pressretur, Stena Scanpaper AB enjoys exclusive collection rights for wastepaper in Halmstad. HAB acts as an exclusive collection subcontractor from ICI sources. HAB has also negotiated a collection sub-contract agreement for paper-based packaging from ICI sources and HAB collects virtually all of this material in Halmstad under this agreement. HAB indicates that very little metal and glass packaging is collected from ICI sources in the municipality.

The return collection facilities and materials collected at each type of depot are summarised below in Table 5-4.

Table 5-4 HAB collection systems for wastepaper and packaging

Wastepaper and packaging collection type	# in main Halmstad Municipality	# in smaller settlements	Financing mechanism
Recycling station	53	20	All costs covered by HAB, land provided free of charge by Halmstad municipality or private landowners. HAB responsible for operation and maintenance under contract with FTi, partial cost recovery.
Multi-family housing collection	70% of multi-family housing units served with on-site collection, all of these served by HAB		For collection by HAB fees are charged on the basis of material type and frequency of pick-up. There are additional costs if there are access constraints.
Single family curb-side collection	Not offered		--
ICI collection	Significant competition in ICI market for plastic packaging.		Free market for collection from ICI consumers for all materials. Stena Scanpaper owns collection contracts for all wastepaper and paper-based packaging (e.g. corrugated cardboard). HAB operating under collection sub-contract agreement with Stena.

5.2.4 Operation of the collection system

Under the **Plastkretsen** agreement, HAB bears responsibility for the quality of sorted plastic packaging, which is graded into grades 'A', 'B' or the lowest 'C'. Plastic packaging collected by HAB under the Plastkretsen collection agreement is transported to an HAB owned sorting facility, which reduces contaminants from roughly 30% to 3% by weight. The facility was built because of the reduced payment to HAB resulting from the relatively contaminated plastics deposited by consumers which resulted in reduced prices for material when collected by Plastkretsen. The location of the facility also serves to reduce traffic congestion from

collection vehicles around the waste incinerator which formerly served as a storage facility for collected materials.

HAB is the only municipal owned company in Sweden with such a facility and their sorting services are also sold to other municipalities and private collection entrepreneurs. HAB noted that while the source separation of plastic packaging by consumers is poor, the sorting facility can provide a quality to merit the top payment level from the Plastkretsen transporter, which takes responsibility for transportation to recovery operations across Sweden. In addition to plastics sorting, HAB also developed processes at this facility to sort wastes from ICI clients on a fee basis, which serves to earn additional revenues for HAB.

Under the sub-contract agreement with Stena Scanpaper AB for **Pressretur and Returkartong**, HAB transports wastepaper and paper-based packaging directly to a Stena facility in Halmstad, which sorts the collected material prior to transport to paper mills. HAB's sub-contract agreement is for collection and transportation only and quality of source separation by consumers does not form a basis for payment to HAB.

Under the **Metallkretsen** agreement, HAB was previously responsible for the quality of sorted materials which formed a basis for payment under their collection contract. However HAB was able to renegotiate their agreement to be for collection and transportation only to a local metal sorting firm. Metal packaging is compressed by HAB prior to delivery to a local metal sorting firm that operates under contract to **Metallkretsen** where the material is sorted and compressed prior to shipment to smelters.

The agreement with **GlasÅtervinning** for glass packaging bases payment on quality of the material sorting, however the source separation of glass by consumers in Halmstad is very good and no reduction in payment occurs based on quality. Collected glass packaging is stored at an HAB facility prior to collection by a GlasÅtervinning transporter.

In order to ensure full accounting for the collection of wastepaper and packaging, HAB maintains separate accounts for each material company contract and closely monitors economic performance for each contract over time. HAB indicates that in general, the revenues from the collection contracts with the material companies and under the collection sub-contract agreement with Stena Scanpaper exceed costs.

Table 5-5 summarises the financial arrangements for the collection of wastepaper & packaging in Halmstad.

Table 5-5 Producer responsibility material processors, Halmstad

Material Company	Primary collection contractor	Pre sorting/treatment	Recycling contractor
Plastkretsen	Halmstads Renhållnings AB	HAB owned plastic sorting facility.	Plastkretsen arranges transport from HAB's sorting facility to various firms across Sweden. Payment based on purity of sorted material, graded in quality as A, B or C.
Metallkretsen	Halmstads Renhållnings AB	No pre-sorting or treatment by HAB prior to delivery at local metal sorting firm.	Sorted metal shipped to smelters in Sweden directly from Halmstad.

Material Company	Primary collection contractor	Pre sorting/treatment	Recycling contractor
		HAB responsible for transportation only.	
Returkartong	Stena Scanpaper AB	No pre-sorting or treatment by HAB. HAB responsible for transportation only	Stena Scanpaper AB, Halmstad sorts and ships material to paper mills.
GlasÅtervinning	Halmstads Renhållnings AB	No pre-sorting or treatment by HAB due to high quality source separation by consumers	Payment based on purity of sorted material. GlasÅtervinning arranges transportation from HAB to SGÅ Glassworks, in Närke
Pressretur	Stena Scanpaper AB	No pre-sorting or treatment by HAB prior to shipping. HAB responsible for transportation only	Stena Scanpaper AB, Halmstad sorts and ships material to paper mills.

Respecting the contract arrangements with the material companies, HAB noted that the various contracts and number of actors in the system for collection and Recycling Station maintenance can present a coordination challenge. To provide a more user friendly and convenient system, HAB expressed the view that municipalities should bear full responsibility for the collection function with producers assuming responsibility for recycling and recovery of collected materials. HAB noted that there is a perception that while municipalities are by law tasked with waste management planning for all waste streams, the current structure of producer responsibility limits the capacity for municipalities to effectively meet their obligation. HAB indicated that a clear delineation of responsibility for collection to municipalities would enable a coordinated and convenient system for consumers for all solid wastes. The role of producers would be to collect materials from the municipalities and ensure environmentally sound management. It was noted that such an approach would significantly simplify financing of the collection system for municipalities by enabling the lawful use of the household waste fees to support effective collection service to consumers. A final rationale provided by HAB for municipal collection responsibility was that when there are problems, consumers invariably look to the municipality to resolve issues and do not perceive producers as being responsible for waste management.

5.2.5 Information and reporting

HAB takes primary responsibility for informing consumers regarding source separation in Halmstad. The means to accomplish this include internet as well as in paper format each six months by mail inserts with municipal billing in addition to being provided on request by consumers. When collection began under the producer responsibility systems FTi provided annual funding of roughly SEK 1 per capita or, in total roughly SEK 85 000 (€9 130). This essentially covered HAB's costs respecting the information program for wastepaper and packaging recycling. In future, HAB will assume full responsibility for informing consumers in Halmstad, however, there is a degree of collaboration in that FTi is consulted respecting the content of consumer information within the municipality. Multi-family building owners which have arranged for on-site collection services take responsibility for informing building residents about source separation of wastepaper and packaging.

Respecting the information for consumers, HAB together with all municipalities in Halland County have initiated a common program to raise awareness of how to properly sort wastes and how the sorted wastes are managed. The campaign informs consumers about wastes by means of a green, yellow and red 'traffic light' system. Under the system 'green light' wastes are described which are suitable for disposal and energy recovery, 'yellow light' wastes which should be source separated for recycling, and 'red light' wastes which are environmentally hazardous and need to be disposed in special facilities.

Concerning the results of the source separation program, HAB produces a detailed annual report on the overall local waste management system, including collection of producer responsibility materials. The report is available free of charge in hard copy at the local office and can be ordered via the HAB internet website.

Consumers can also access information on collection of packaging in Halmstad via the FTi internet website, where packaging collection statistics on a per-capita basis are reported as well as figures from Pressretur, which publishes per-capita and total wastepaper collection statistics. When projecting total collection based on Halmstad's municipal population, the collection results reported by producers are inconsistent with the information reported by HAB.

Of note are the collection differences in plastic packaging between years 2000 and 2001 and 2003 – 2004, which are attributed to differences in the point within the collection system at which material is counted. Presently, statistics are gathered based on unsorted materials delivered to the plastic sorting plant, which is considered to be a more accurate depiction of the result. Respecting the inconsistencies with figures reported by FTi, HAB notes that the large number of actors in the system presents a potential for double counting and there have also been disagreements among some actors in the past respecting how 'packaging' should be defined. Nonetheless, HAB expresses significant confidence in the figures that it reports and indicates that there is a greater potential for data errors on the part of FTi.

Table 5-6 summarises reported quantities of wastepaper and packaging collected and recycled in Halmstad for the period 2000 - 2004.

Table 5-6 Wastepaper and packaging collection, 2004, Halmstad

	Reported by HAB					Reported by Producers for 2004[1]	
Ton	**2000**	**2001**	**2002**	**2003**	**2004**	**kg per-capita**	**Projected total (ton)**
Wastepaper	3 910	3 916	3 975	4 073	4 330	49[2]	4 345[2]
Paperboard	957	937	936	917	939	9.27	815
Corrugated cardboard	898	846	897	1 039	1 221	52.35	4 603
Glass	1 688	1 614	1 632	1 730	1 675	19.04	1 674
Plastic	132	80	69	47	137 hshld. 1 027 ICI	1.95	171 (excl. ICI)
Metal	124	147	148	164	148	3.92	345

Source: HAB Annual Report, 2004 (RenhållningsBolaget Årsredovisning, 2004), except
(1) FTi, 2005 and (2) Pressretur, 2005

5.3 Case #4 Municipality of Göteborg

5.3.1 Background[7]

The Municipality of Göteborg is located on Sweden's west coast in the county of Västra Götaland. At 31 December 2004 Göteborg's population was 481 410 residents, however the regional population is considerably larger at roughly one million residents. The municipality of Göteborg is surrounded by several surrounding municipalities but does not bear municipal responsibilities for these areas. Roughly 60% of Göteborg's population resides in multi-family housing and the remainder in single family residences.

In 1998 the Göteborg municipal Sanitation Company (Göteborgs Renhållningsverk) together with municipal waste organisations of ten surrounding municipalities merged to form Renova, a joint municipal company which currently offers waste collection and treatment as well as waste to energy services to its municipal owners. Göteborg municipality is the majority owner holding 85% of Renova shares (Lindman, 2005). The Göteborg Department of Sustainable Water and Waste Management takes responsibility for planning and implementation of solid waste management and purchases waste collection and management services from Renova and other private waste management firms under competitive bidding processes. Renova indicates that at August, 2005, it enjoys a market share for household of roughly 70% of household waste collection in Göteborg with the remainder shared by two private firms, IL Recycling and SITA Sverige AB.

Because of a significant investment in a large incineration plant, the municipalities that jointly own Renova formally agreed that the facility be granted a monopoly on all household waste treatment irrespective of who collects the material within member municipalities. At present Renova indicates that there is a discussion whether this arrangement is consistent with EU competition rules, which came into force since the agreement was drafted (Lindman, 2005).

As a municipality Göteborg has significant environmental ambitions that are outlined in its Integrated Water and Waste Management Plan. Goals for solid waste under the plan include, as examples, a zero increase in per-capita household waste generation in the short term with ambitions for waste reduction over the longer term. Of note, the municipality has ambitions to work toward influencing consumption and production patterns, developing labelling systems to inform consumers regarding environmentally sound product end-of-life management as well as numerous other ambitious goals.

5.3.2 Emergence of Producer Responsibility in Göteborg

As early as 1981 there was a municipal collection system in Göteborg for glass and newsprint. Given that incineration had largely eliminated solid waste land-filling in Göteborg, one rationale behind this development was that increased material recycling was considered the only meaningful manner in which environmental performance could be improved (Lindman, 2005). The ambition under this system was to provide a Recycling Station for each 500 residents, although the collection system in the end comprised roughly one station per 1 000 residents in addition to on-site collection from a limited number of multi-family buildings.

In 1993/4 the municipality ran a design competition to develop a future collection system and the chosen model was based on high quality aesthetically pleasing concrete recycling stations

[7] Except where noted, the information presented in the case study is based on in-depth personal interviews with Andersson, Kaj, and Antoni, Bo, both of Göteborg Stads Kretslopp

(Lindman, 2005). To find suitable locations for the facilities, there were intensive efforts made in partnership with the city planning board to strategically maximise convenience for consumers. In general terms there is a station at the entry to each residential district as well as along common travel routes. Because of the unique design, investments were also required for heavy crane lifting vehicles to collect materials from the stations (Lindman, 2005). Although these programs were financed by the municipality through the fees for waste disposal, there was a good degree of support for this work among the public.

When the producer responsibility systems were being implemented in the mid 1990s, the municipality took the view that there were sound reasons to continue to be involved in the collection of wastepaper and packaging in Göteborg. There were a number of reasons behind this view. Firstly, there was an ambition to ensure a well coordinated infrastructure for all solid waste management in Göteborg and there was a lack of confidence in a system managed by many actors, each taking responsibility for different material fractions (Andersson, 2005). Secondly, the municipal waste company had acquired many years experience collecting source separated wastes and had made substantial investments of money and effort into the development of the municipal collection infrastructure, which was considered to be among the best developed in Sweden. Because of questions regarding the capacity and willingness of producers to provide a quality system in a large complex city, continuing to operate the collection system was seen as a means to protect the municipality's rather significant investments and the public's trust (Lindman, 2005).

The Göteborg City Planning Board was also expressing concerns about aesthetic issues connected to the Recycling Stations that were proposed by producers (Lindman, 2005). The Board was unprepared to accept what it perceived as unsightly simple metal containers to be distributed throughout the municipality. Because Göteborg has highly developed architectural and landscape planning as well as the significant tourism industry, the Board took the view that the Göteborg Sanitation Company was best placed to protect aesthetic interests of the municipality. Accordingly, the city planning board was encouraging the Göteborg Sanitation Company to retain responsibility for the collection system rather than turn the system over to producers (Lindman, 2005).

Finally, there was a political ambition within the City Council to provide environmental services and improve the environmental performance of the municipality. Taking this ambition forward was an Environment Party member of City Council who for a number of years sat as Chairman of the Board of Directors for the Göteborg Sanitation Company, and later Renova (Lindman, 2005).

Based on the above rationales the Göteborg Sanitation Company's political Board of Directors decided that the company should prepare bids for the collection contracts with the material companies. For a considerable number of years, the Göteborg Sanitation Company, and later Renova, has held the primary collection contracts for Plastkretsen, Pressretur, Metallkretsen and GlasÅtervinning. The primary collection contract for Returkartong has also for many years been the private firm IL Recycling.

5.3.3 Collection infrastructure

Recycling Stations

There are at present 436 **Recycling Stations** in the Göteborg municipality, corresponding to one station per 1 100 residents, slightly fewer than the original number of provided under the earlier municipal system for newsprint and glass. There was an original goal of providing a Recycling Station within 400 metres of all residences, however at present larger Recycling

Stations at shopping centres are under consideration. The locations and number of Recycling Stations are agreed between the Göteborg municipality and FTi. The stations were designed to represent a permanent fixture within the municipality and significant care was taken to ensure close cooperation with the planning authorities to prevent problems in the future. To ensure consumers were comfortable using the stations, grounds were prepared to facilitate easy cleaning, good high quality lighting was installed and large quality signage to assist consumers in sorting materials was installed. These represented a large investment in both infrastructure and an administrative cost which was carried entirely by the municipality without financial support from FTi.

In August, 2005 the municipality reached an agreement with FTi concerning the future of the network of Recycling Stations. Under the agreement, ownership of the collection stations and responsibility for maintenance will rest with FTi and the current network of stations will gradually decrease from the current number to roughly 340 larger stations. FTi did agree to ensure that the future stations will remain with an aesthetically pleasing design. Concerning real estate costs the Göteborg Department of Sustainable Water and Waste Management will continue under the new agreement to rent land from a different division of the municipality but will receive full compensation for these costs from FTi.

Operation and maintenance costs have been managed by Renova under an agreement as a 'coordination company' with FTi since early 2005 and their responsibility includes litter removal and general cleaning of the stations in Göteborg. Prior to 2005, litter removal and other cleaning was undertaken by two different organisations. From the start of collection from the Recycling Stations the Göteborg Sanitation Company managed all aspects of the Stations. When Renova was formed in 1998, the Recycling Station maintenance role remained within the municipality under the Göteborg Parks Department's responsibility until January, 2004. From that point until January 2005, a state organisation employing disabled persons provided litter and waste removal services for the stations. The municipality indicates that in all instances, contract terms offered by FTi were sufficient to cover costs.

The municipality did note a structural problem behind litter problems under the producer responsibility system in that there is an inherent conflict between the collection contractors and the litter removal and cleaning contractors. The conflict occurs in that poor collection performance will result in overfilled containers which will increase the cleaning requirements because consumers leave materials at stations rather than make a second trip at another time. Consequently, fixed price litter removal contracts can easily become unprofitable and service suffers.

Under the new agreement between the Göteborg municipality and FTi concerning the Recycling Stations, producers accept full responsibility for maintenance and removal of litter while the municipality retains the right to remove and dispose wastes the cost of FTi if required.

Multi-family housing

When the Recycling Station network was being established, one option offered by the Göteborgs Sanitation Company, later Renova, was for owners of multi-family buildings to purchase ready-built collection structures to serve the building at a competitive price. If the multi-family building in question contained a minimum number of residents the price offered by the municipality was reduced from SEK 150 000 (€16 070) to SEK 50 000 (€5 360) as an incentive to larger building owners. There were some restrictions that were applied by the municipality in that any facility that was purchased must be accessible to non-residents (e.g. neighbours in adjacent buildings) on the assumption that each station could serve three to five

buildings. There were also restrictions concerning the distribution of these collection facilities throughout the municipality. Altogether, roughly 200 of the Recycling Stations in Göteborg were built under such arrangements (Lindman, 2005). As part of its current service package for multi-family buildings, Renova continues to offer structures for onsite collection.

The municipality indicates that competition for market share in collection from multi-family buildings is very intense. Illustrating the degree of competition in Göteborg, entrepreneurs are often offering the collection service at or below cost as a means to build relationships with clients to potentially win other service contracts such as household waste removal. Despite the very competitive conditions, the municipality estimates a maximum of 20% of multi-family buildings are served with on-site collection for wastepaper and packaging, although because of efforts that predate producer responsibility, paper and glass are more commonly collected than the other material fractions (Andersson, 2005).

As noted in Section 5.3.1, Göteborg's household waste collection is tendered under competitive bidding processes and Renova presently enjoys a market share of some 70% with the remainder collected by the private firms, IL Recycling and SITA Sverige AB. Because municipalities have a monopoly over offering services for household waste collection, private entrepreneurs can only offer household waste collection services to municipalities. However, in districts where private firms hold household waste collection contracts with the municipality they will be substantially advantaged in offering collection services for wastepaper and packaging form multi-family buildings.

Respecting the quality of material sorting from multi-family housing collection, Renova indicates that an overall judgement cannot be made at present. In some instances it is noted that the sorting quality is superior to materials collected at the recycling stations when there are high quality facilities, whereas in other cases the sorting quality is very poor. The quality of the collection facility was noted as one reason behind poor sorting performance, particularly in historic buildings where poor lighting and space restrictions cannot be resolved due to heritage building protection regulations (Lindman, 2005).

In terms of pricing for collection from multi-family buildings, Renova offers a standards fee based on the residential floor area of buildings for collection of all material fractions. The pricing is set such that overall costs for household waste disposal together with the wastepaper and packaging collection offer a meaningful savings. Renova indicates that these fees are considered commercially confidential.

The municipality indicated that a significant barrier to the expansion of on-site collection from multi-family buildings in Göteborg is that building managers and owners are not willing to pay for this collection. Rather, they take the position that all costs for collection and management of wastepaper and packaging should be fully internalised into prices of products. The municipality noted that attempts in the Stockholm municipality to impose a requirement that multi-family buildings provide on-site collection facilities were strenuously resisted and a number of legal proceedings are currently underway in this regard.

Curb-side collection from single family residences is not offered in Göteborg.

ICI Consumers

There is at present a free market for collection of wastepaper and packaging from ICI consumers in Göteborg. However, the municipality indicates that they are in the process of

enforcing a legal interpretation of the definition of 'household waste' to include wastepaper and packaging materials from all sources in Göteborg, including ICI and multi-family buildings. This would provide the municipality with economies of scale by providing a monopoly on collection for all similar type wastes from all sources in Göteborg. This move has been initiated on the basis that when some waste fractions are lost to private entrepreneurs economies of scale are lost resulting in increased unit costs for the waste fractions for which the municipality continues to bear responsibility. A private waste management firm has challenged the interpretation and the issue is at present before the courts.

The return collection systems in Göteborg are summarised in Table 5-7.

Table 5-7 Collection systems for wastepaper and packaging, Göteborg

Wastepaper and packaging collection type	Recycling Stations and Collection Infrastructure	Financing mechanism
Recycling station	436	Significant collection system developed by municipality prior to producer responsibility systems. All costs covered by municipality for Recycling Stations. Operation and maintenance undertaken by municipal waste management company under agreement with FTi as a regional 'coordination company'.
Multi-family housing collection	Maximum 20% of multi-family housing units served with on-site collection, very competitive market for this collection.	Negotiated between property owner and collection contractor. In many cases collection entrepreneurs are offering this service at or below cost to build relationship to customers to offer additional value added services. Göteborg municipality is striving to apply interpretation of 'household waste' to include wastepaper and packaging wastes from all sources including multi-family housing.
Single family curb-side collection	Not offered	--
ICI collection	Renova as well as private operators are active in this market.	Free market for negotiation between collection contractors and ICI consumers. Contractors require agreement with material companies. Göteborg municipality is striving to apply interpretation of 'household waste' to include wastepaper and packaging wastes from all sources including ICI.

5.3.4 Operation of the collection system

The Göteborg municipality indicates that because of intense interest on the part of the private sector in winning the primary collection agreements, producers are able to impose contracts which place the responsibility for the quality of collected materials with the collector. In addition, the municipality indicates that the level of competition in Göteborg has led to the collection entrepreneurs operating under very thin margins and, when unanticipated contingencies arise there is a strong potential that collection service suffers.

The Göteborg Sanitation Company, and later Renova, has been the primary collection contractor for Plastkretsen, Metallkretsen, GlasÅtervinning and Pressretur. The Returkartong collection contract is held by IL Recycling which collects paper-based packaging within Göteborg municipality. With respect to the operation of the system, Renova indicates that it

is difficult to fully separate the recycling function from that of collecting household waste (Lindman, 2005).

Because the collection contracts are structured such that material purity forms a basis for payment, Renova operates two material sorting facilities where collected plastic, metal and glass are sorted to ensure material purity. Combustible wastes that are sorted out of the packaging are sent for energy recovery along with household waste. Renova indicates that source separation efforts of consumers is good due to a very high level of awareness and environmental ethic and that contaminants are in the order of 3 – 4 percent by weight in collected packaging. Renova notes that the sorting plants are large separation facilities for which packaging represents a minority of materials handled at the facilities with construction and commercial waste separation representing the larger fraction of the work (Simonsson, 2005). The material companies arrange for transportation direct from the Renova sorting plants for all packaging types.

For newsprint, Renova has contracted with the private sector firm HA Industrier which sorts wastepaper prior to shipment to paper mills for recycling. As with packaging, the quality of material sorting forms a basis for payment, however the sorting effort ensures that payment is rarely reduced for quality reasons.

Prior to the formation of Renova through the amalgamation of the regional municipal waste organisations, the level of collection service for wastepaper and packaging that could be provided was determined by the environmental ambition of the municipality and the willingness of consumers to pay. From the economic perspective, there was view that the municipal body was meeting an important pubic need that was recognised as being inconsistent with the producer pay principle. The financial performance of the collection was not considered to be a major issue as long as the service was performed within a municipal department. After Renova was formed as a municipal company the regional waste management market was opened up to market competition. Shortly thereafter, the collection of wastepaper and packaging under the producer responsibility systems was recognised as a poor business proposal which undermined Renova's competitiveness. In this respect Renova indicates that by fiscal year 2003/4 in sum total the contracts for wastepaper and packaging were producing an annual deficit of some SEK 15-20 million (€1.6 – €2.2 million) (Lindman, 2005).

After some years, there were discussions between Renova and producers respecting a possible shifting of ownership and responsibility for the stations to producers. However producers were not prepared to pay to cover the rather large investment in the collection system that the municipality had made to develop the system.

Table 5-8 summarises the financial arrangements for the collection of wastepaper & packaging in Göteborg.

Table 5-8 Producer responsibility material processors, Göteborg

Material Company	Primary collection contractor	Pre sorting/treatment	Recycling contractor
Plastkretsen	Renova AB	Renova sorts materials at one of two Renova owned sorting plants. Producers collect	Plastkretsen arranges transport from Renova sorting facility. Payment based on purity of sorted material, however high quality sorting by consumers

Material Company	Primary collection contractor	Pre sorting/treatment	Recycling contractor
		directly from the sorting plants.	and post collection sorting ensure payment is rarely reduced.
Metallkretsen	Renova AB	Renova sorts materials at one of two Renova owned sorting plants.	Metallkretsen arranges transport from Renova sorting facility. Payment based on purity of sorted material, however high quality sorting by consumers and post collection sorting ensure payment is rarely reduced.
GlasÅtervinning	Renova AB	Renova sorts materials at one of two Renova owned sorting plants.	GlasÅtervinning arranges transport from Renova sorting facility. Payment based on purity of sorted material, however high quality sorting by consumers and post collection sorting ensure payment is rarely reduced.
Returkartong	IL Recycling Service AB	IL Recycling coordinates collection of paper-based packaging in Göteborg.	IL Recycling transports collected paper & cardboard packaging to various paper mills.
Pressretur	Renova AB	Renova contracts with HA Industrier to provide sorting services for wastepaper. HA ships materials on behalf of Renova to paper mills.	Payment based on purity of sorted material, however high quality sorting by consumers and post collection sorting ensure payment is rarely reduced.

5.3.5 Information and reporting

The Göteborg Department of Sustainable Water and Waste Management takes primary responsibility for informing residents of Göteborg respecting the source separation program. Information efforts to encourage consumers to participate in source separation include advertising efforts, provision of low cost promotional materials for building owners/landlords and printed materials distributed to all households. Until 2004, FTi provided financial support at roughly SEK 0.5 per-capita (€0.053), which represents a minority of the overall cost for information provision. Since municipalities were assigned responsibility for consumer information for 2005 onward, FTi no longer provides financial support for this purpose, however the municipality is able to lawfully take advantage of household waste disposal fees to finance the information effort.

Reporting results of the program, the municipality publishes a detailed annual report as well as provides information via it internet website. FTi also publishes per-capita collection results for packaging in Göteborg and Pressretur publishes the result for wastepaper. Projecting total collection based on population in Göteborg reveals rather large differences between the reported figures, particularly for corrugated cardboard, paper and metal packaging. The municipality indicates that the cause of the disagreement between the two sources is uncertain,

but notes that there have been efforts at the national level to standardise methods of compiling waste statistics. Additionally, the municipality has engaged a consultant to examine its methods and results extending back to 1990 are being re-examined to attempt to determine whether a relationship exists between economic growth and waste generation

Table 5-9 summarises reported quantities of wastepaper and packaging collected and recycled in Göteborg for the period 2000 through 2004 and as reported by the producers for 2004.

Table 5-9 Wastepaper and packaging collection 2004, Göteborg

	Reported by Göteborg Department of Sustainable Water and Waste Management					**Reported by Producers for 2004**[1]	
Ton	**2000**	**2001**	**2002**	**2003**	**2004**	**kg per-capita**	**Projected total (ton)**
Wastepaper	28	25	22	18	28.65	60[2]	28.65[2]
Corrugated cardboard	3 600[3]	3 500[3]	3 800[3]	4 300[3]	4 700[3]	34.64	16,676
Paperboard	1 800	1 900	2 000	2 200	2 400	6.25	3,009
Glass	7 800	7 500	7 800	7 700	7 600	15.8	7,606
Plastic	500	600	440	500	590	1.08	520 (excl. ICI)
Metal	400	300	340	400	430	3.39	1,632

Source: Göteborg Department of Sustainable Water and Waste Management Annual Report, 2004 (Göteborg Stads Kretslopp Verksamheten, 2004) except (1) FTi, 2005, (2) Pressretur, 2005, (3) Göteborg Department of Sustainable Water and Waste Management (Göteborgs Stads Krettslop), 2005 online statistics.

5.4 Case #5 Municipality of Ystad

5.4.1 Background[8]

The Municipality of Ystad is a coastal port city located in Sweden's southernmost county of Skåne. At 31 December 2004 Ystad's population was 26 898 residents, however Ystad is a popular summer tourism destination at its population can be double that figure in the busy summer months. Within the Ystad municipal boundary lie the villages of Nybrostrand, Köpingebro, Sövestad, Svarte, Löderup, Glemmingebro and several other smaller settlements for which Ystad bears municipal responsibilities. The municipality indicates that 46% of residents reside in multi-family housing with the remainder in single family homes.

The Ystad Technical Services Department (Teknisk Service) is a Municipality of Ystad municipal department that is responsible for waste management. The department is directly accountable to a designated City Council member, who is in turn accountable to the Council respecting waste issues.

5.4.2 Emergence of Producer Responsibility in Ystad

In the 1980's early collection of wastepaper and glass was undertaken by community organisations and sports clubs as a means of raising revenues for their organisations. The paper industry paid for the collected newsprint and other paper materials based on the market value of the recovered paper fibre, while the glass industry paid the collectors for scrap glass voluntarily in order to maintain its environmental profile among consumers and governments. The municipality of Ystad did not formally participate in this work and no formal investments in return collection infrastructure for wastepaper and packaging were made in Ystad prior to the emergence of producer responsibility in 1994.

With the implementation of the packaging and wastepaper ordinances in 1994, producers requested that Ystad develop a network of Recycling Stations within the city in partnership with FTi. The municipality of Ystad took the position that producers should fulfil their obligations to the full extent required under the law and agreed only to advise FTi respecting the distribution of Recycling Stations throughout the city. On this matter, the political direction was that fees and taxes should be minimised as much as possible. Accordingly, it was felt that involvement with the producer responsibility systems would require new investments in equipment and infrastructure which the municipality felt would be potentially costly as well as expose the city to commercial risk. Nonetheless, Ystad agreed to enable the construction of stations by providing access to municipally owned land in parking lots and roadsides in residential areas. On the question of environmental effectiveness, there was a recognition within the municipality that multiple collection contractors serving the material companies had the potential for increased heavy vehicle traffic.

When collection began under the producer responsibility systems, the primary collection contracts for the Returkartong and Pressretur systems were won by Stena Scanpaper AB, which has since remained the primary contractor for both. Similarly, for the Plastkretsen and Metallkretsen systems it was SITA Sverige which has held the primary collection contracts for the duration of the operation of the systems. For the GlasÅtervinning collection contracts it has been Ekdahls Åkeri AB since 1994, and since January, 2005, Ekdahls has also served as

[8] Except where noted, the information presented in the case study is based on an in-depth personal interview with Wiking, Ronny, Ystad Technical Service Department

the local 'coordination contractor' for Ystad municipality to remove litter and ensure the Recycling Stations are in acceptable condition.

5.4.3 Collection infrastructure

Recycling Stations

There are currently 9 **Recycling Stations** located in the main city of Ystad, and a further 10 in smaller villages within the municipal boundary. The municipality sought to have FTi establish at least one station per thousand city residents with a preference for locations that are frequented by householders such as retail parking lots and neighbourhood roadside areas that are convenient for vehicle traffic.

There was no target respecting the distances between residential housing and the Recycling Stations, and none are located in the historic centre of Ystad, with the narrow streets and an overall shortage of space being the primary barriers. Notably, when the network was being developed many residents advocated for a station nearby for convenience reasons. Presently, proposals for new Recycling Stations are often met with public resistance given concerns about litter and vehicle traffic, both from personal vehicles as well as heavy collection vehicles. To address this opposition, the Ystad municipality requires any new residential lands opened for development to designate a specifically zoned area for the Recycling Stations. ´

The **construction costs** for the network of Recycling Stations were financed entirely by producers and the containers at the stations are owned by FTi directly. The Ystad Technical Services Department has an agreement with FTi respecting their respective roles and responsibilities, which for the municipality are primarily surrounding land provision for the Recycling Stations. All municipal land for the Recycling Stations was provided by Ystad free of charge to FTi from land that was previously owned by the municipality.

Producers also retain full financial responsibility for all **operation and maintenance** costs for the stations, including removal of litter, which is undertaken by the 'coordination contractor' under contract with FTi. Concerning the overall operation of the Recycling Stations, the municipality of Ystad is generally satisfied, however the municipality did express concerns respecting litter and general cleanliness. For wastes deposited at the stations that are not subject to producer responsibility, the collection contractors transfer this material to the Ystad Technical Services Department for disposal, however quantities of material requiring disposal are very small.

The Ystad Technical Services department bears responsibility for monitoring the source separation by consumers at the Recycling Stations although FTi has also undertaken periodic surveillance of Recycling Stations in Ystad. Because of FTi's efforts several individuals in Ystad have faced charges for litter offences which received some local media coverage and this coverage is believed to have considerably discouraged litter and deposit of inappropriate materials at the Recycling Stations.

Multi-family housing & ICI collection

All **collection from multi-family buildings and from ICI sources** in Ystad is operated entirely by private sector collection contractors. The Technical Services Department does not maintain statistics respecting the numbers of multi-family housing buildings served with collection services, noting that this is not an area of municipal responsibility, but rather one for producers.

Stena Scanpaper AB, the primary collection contractor for wastepaper and paper-based packaging in Ystad indicates that it is the major provider for on-site collection from multifamily buildings in Ystad, of which some 50% have access to this service (Andersson, 2005). Stena did note that the exclusive collection rights for wastepaper provides an advantageous position in this market because, while other firms can collect wastepaper together with the other packaging materials, there is an obligation to deliver wastepaper only to the primary Pressretur collection contractor for the municipality.

Stena notes that materials collected from multi-family buildings are generally of higher quality than what is collected from Recycling Stations and believes that the source separation effort by consumers is more complete. Stena notes that the market for multi-family buildings is less attractive than that from commercial business as there is no opportunity to offer household waste collection services to a building owner given the municipal monopoly position over this waste stream. The more attractive market is the ICI sector where there is opportunity to offer additional waste services to the client that compliment the wastepaper and packaging collection. For competitive reasons, fees charged by private collection entrepreneurs for collection from both multi-family buildings and ICI sources are confidential.

The Technical Services Department notes that Ystad City Council favours the implementation of collection at all multi-family buildings as well as at curb-side for single family housing however it notes that there is little interest on the part of producers to provide this level of service. In support of its position, the Technical Services Department argues in favour of public convenience and asserts that when collection takes place closer to the home there is an improved material sorting performance on the part of consumers and reduced littering. The department also indicated that in the future it would support a substantially expanded deposit-refund system for all glass containers as a measure to improve the performance of the producer responsibility system.

The return collection facilities in Ystad are summarised in Table 5-10.

Table 5-10 Ystad producer responsibility collection infrastructure

Wastepaper and packaging collection type	# in main Ystad Municipality	# in smaller settlements	Financing mechanism
Recycling station	9	10	Land provided by Ystad municipality at no cost to producers. Construction and operation & maintenance costs paid by entirely by producers.
Multi-family housing collection	Roughly 50% of multifamily buildings served, largely by STENA Scanpaper.		Negotiated between property owner and collection contractor. STENA offers standardised pricing for all buildings in Ystad.
Single family curb-side collection	Not offered		--
ICI collection	Collection on-site entirely by private sector contractors		Negotiated between ICI consumer and collection contractor.

5.4.4 Operation of the collection system

Since the Ystad municipality decided to leave the collection of wastepaper and packaging entirely up to producers, there are no financial consequences for the municipality respecting neither the collection and recycling system nor the quality of material sorting by consumers at the Recycling Stations. The department does note that litter has been problematic in the past, particularly for paper based packaging as these containers have tended to fill frequently and consumers are often unwilling to return materials to the home. However there has been a noticeable improvement recently in the condition of the stations.

Under the **Returkartong & Pressretur** agreements, the collection contractor Stena Scanpaper collects wastepaper and paper based packaging from Recycling Stations and other sources in Ystad for transportation to a Stena sorting plant. Collected materials are sorted into a variety of grades prior to shipment directly to paper mills (Ydsten, 2005).

Under the collection contract for the **Plastkretsen** system responsibility for quality of collected materials rests with the collection contractor, SITA Sverige AB. SITA notes that the plastic material stream is typically the most contaminated of the producer responsibility material streams and estimates contaminants at between 10 and 15% by weight. Because the material quality forms the basis of payment from Plastkretsen, SITA sorts the material prior to delivery to a Plastkretsen authorised receiver near Ystad. Because of SITA's sorting effort, the material generally receives the highest quality grade. Disposal of non-packaging materials collected in the containers is the responsibility of SITA (Lundsgard, 2005).

The Technical Services Department notes that there has been a degree of uncertainty among consumers respecting the source separation of plastic packaging since soft plastic packaging (films, bags etc.) are no longer source separated but disposed with household waste. This is on the understanding that Ystad's household wastes are treated by energy recovery, which is considered an acceptable management method for soft plastic under the Ordinance. Since consumers were initially source separating all plastic packaging, there is a possibility that the new requirements are not well understood by all consumers resulting in high levels of soft plastic contaminants in collected materials.

Under the **Metallkretsen** system, responsibility for the quality of collected materials also rests with the collection contractor, SITA Sverige AB. SITA notes however that the quality of metal sorting is generally very good in Ystad, however some minor sorting is required which is undertaken at a SITA facility prior to delivery to a Metallkretsen receiver near Ystad (Lundsgard, 2005).

Under the **GlasÅtervinning** system, the primary collection entrepreneur, Ekdahls Åkeri AB, assumes responsibility for the quality of collected material, however the quality of glass sorting by consumers in Ystad is very good and nearly always meets the requirements of GlasÅtervinning. Nonetheless, collection staff periodically inspect containers and remove contaminants if required prior to deliver to a GlasÅtervinning receiver. Ekdahls Åkeri is also the local coordination contractor under contract with FTi and ensures removal of household wastes and litter from the stations. Waste and litter collected at the stations is delivered to the municipality of Ystad, which takes responsibility for disposal. Ekdahls indicates that this is a significant business and that considerable work is required to maintain the stations in a clean condition (Kristiansson, 2005).

Table 5-11 summarises the financial arrangements for the collection of wastepaper & packaging in Ystad.

Table 5-11 Producer responsibility material processors, Ystad

Material Company	Primary collection contractor	Pre sorting/treatment	Recycling contractor
Plastkretsen	SITA Sverige AB	SITA owned plastic sorting facility. Non-packaging plastic wastes disposed by SITA	SITA delivers sorted plastics to Plastkretsen receiver near Ystad. Payment based on purity of sorted material.
Metallkretsen	SITA Sverige AB	SITA owned metal sorting facility. Non-packaging metal wastes disposed by SITA.	SITA delivers sorted metal to Metallkretsen receiver near Ystad. Payment based on purity of sorted material.
Returkartong	Stena Scanpaper AB	Stena owned sorting facility. Non-packaging wastes disposed by Ystad municipality.	Stena Scanpaper transports collected paper & cardboard packaging to a Stena sorting plant prior to shipment to various paper mills. Payment based on purity of sorted material.
GlasÅtervinning	Ekdahls Åkeri AB	Periodic informal pre-sorting during collection.	Ekdahls Åkeri AB delivers collected glass to GlasÅtervinning, which takes responsibility for further transport and recycling. Payment based on purity of sorted material, however consumer sorting quality is very good.
Pressretur	Stena Scanpaper AB	Stena owned sorting facility. Non-wastepaper wastes disposed by Ystad municipality.	Stena Scanpaper transports collected wastepaper to a Stena sorting plant where the material is sorted into various grades prior to shipment to paper mills. Payment based on purity of sorted material.

5.4.5 Information and reporting

The function of informing consumers of locations of the Recycling Stations and sorting of wastepaper and packaging is undertaken both by FTi and the Ystad Technical Services Department via their respective internet websites. The Ystad Technical Services Department also informs consumers respecting the Recycling Stations and waste separation in the form of informational brochures which are periodically distributed along with billing for other municipal services. FTi has to date covered roughly half of the Ystad Technical Services Department's costs, which amount to roughly SEK 50 000 annually for information.

The Ystad Technical Services Department notes that FTi will periodically request that information efforts on the part of the municipality be increased in order to improve source separation by consumers in Ystad. However, the municipality takes the view that as a small community with limited resources information efforts cannot always meet the expectations of producers. The Department also notes that despite efforts to direct consumers to FTi or the local coordination contractor, Ekdahls Åkeri, respecting concerns and questions consumers continue to contact the municipality in this regard.

The Ystad Technical Services Department relies on producers to inform consumers about the collection and recycling system via the FTi and Pressretur websites. In this respect, FTi publishes per-capita statistics for packaging, and Pressretur publishes both per-capita and total collection within the municipality. The reported results are presented below on Table 5-12 for the year 2004.

Table 5-12 Wastepaper and packaging collection, 2004, Ystad

Packaging type	**Per capita collection (kg)**	**Projected total (ton)**
Wastepaper[1]	47	1 264
Corrugated cardboard	37.06	996.8
Paper packaging	7.35	197.7
Glass	16.39	440.9
Plastic (excluding ICI)	2.57	69.13
Metal	4	107.6

Source: FTi, 2005a except for (1) Pressretur, 2005

6 Discussion and analysis

Section 4 described the Swedish EPR systems for wastepaper (newsprint, print advertising, telephone directories etc.) and packaging and outlined key issues and developments currently facing the system. Section 5 profiled implementation of the producer responsibility systems for wastepaper and packaging in four municipalities. Three of the profiled municipalities were either wholly or partly serving as primary collection contractors for producers and as a basis for comparison one municipality where only private sector collectors were operating was profiled.

The following discussion explores issues that arise within the elements within the analytical framework described in Section 1. While some of the issues that are discusses under the various elements may not be directly relevant to the element in question (e.g. litter under 'physical management'), they arise as a result of how the element is implemented under the systems.

6.1 Collection

6.1.1 Physical management

As noted in Section 4.3 the Packaging Ordinance does not define the level of service that producers are required to provide and the Recycling Station collection system ended up as a compromise between accessibility for consumers and accessibility for collectors. The system for which producers developed and for which they maintain responsibility is a network of some 7 500 Recycling Stations across Sweden, corresponding on average to one Recycling Station for each 1 200 residents. Producers coordinate collection on a material by material basis and hire collection contractors for each material type within each municipality.

Collection infrastructure

The compromise in the collection system between convenience for consumers and accessibility for collectors has not been without its complications. All of the studied cases noted significant problems with litter and waste deposited at the Recycling Stations. Although there have been contracts between FTi and contractors to remove litter and waste, there is a complaint that the number of actors in the system substantially complicates attempts to hold any single party accountable for problem stations. The relationship between the frequency of collection from the Recycling Stations and the incidence of litter due to overfilled containers illustrates this problem. Should an overfilled container lead to littered materials, authorities can be challenged to assign responsibility since the cause could be said to rest jointly with the offending consumer, the material company and its contractor as well as with the litter removal contractor.

In the cases where the municipalities hold contracts with FTi for maintenance and litter removal, they complain that litter removal contracts are insufficient to cover actual costs required to maintain an acceptable standard of cleanliness. In case #4 where a private sector 'coordination contractor' is removing litter and waste from the stations, the contractor indicates that litter clean up is a significant ongoing task and that the agreement with FTi was considered a valued business. There are two observations can be drawn from these experiences. First, given that the network of Recycling Stations has been in operation under producer responsibility for over ten years, litter is likely an inherent feature of 'bring' systems and will require the dedication of ongoing resources toward this problem. Further, the apparent difference in experience between the private sector 'coordination contractor' and that

of the municipalities suggests that producers may potentially be looking to municipalities to shoulder the burden of litter removal where possible.

Multi-family building collection

For collection from multi-family buildings producers have agreed to a voluntary target of on-site collection service at 75 percent of Swedish multi-family buildings by 2006. Two of the profiled cases (cases #1 Lund and #2 Halmstad) have comparatively well developed multi-family building collection and estimate coverage to be roughly 70% in both municipalities. In these instances, it is the municipalities that are offering this service and both indicate they are nearly the exclusive service provider within their respective municipality. For case #4, Ystad, private sector waste firms are offering this service and they indicate that market penetration is in the order of 50%, nearly all served by a the Pressretur contractor. Case #3, Göteborg, is unique in that there have been considerable efforts on the part of the municipal waste company to promote multi-family building collection over an extended period of time and yet only some 20% of buildings are served with onsite collection. However, the quality and convenience of the established network of Recycling Stations may be one explanation for a perceived lack of need on the part of building managers to make required investments.

The cases reviewed indicated some interesting observations concerning on-site collection from multi-family buildings. Aside from the obvious increase in convenience for consumers, three of the profiled cases indicated that when collection occurs close to the home the sorting effort on the part of consumers is more complete. Further, in two of the four cases respondents also reported a higher quality sorting performance on the part of consumers. These observations are likely a result of the financial incentive for more complete sorting efforts and the likelihood that consumers are inclined to take greater personal responsibility for their source separation efforts and the cleanliness of the facility. A further mechanism supporting better source separation is opportunity for collectors to reinforce good sorting practice by leaving incorrectly sorted materials behind or charging differentiated rates based on sorting quality, as was practiced in Halmstad.

Table 6-1 provides an overview of the return-collection infrastructure in each of the profiled municipalities.

Table 6-1 Return-collection infrastructure

	Recycling Stations	**Residents /station**	**Est. avg. distance**	**Multi-fam. Bldg. coverage**	**Pop. In multi-fam. Housing**
Case #1 Lund	18 (main muni.) 7 (outer villages)	3 901	400 - 600 m (main muni.) more in outer villages	70%	65%
Case #2 Halmstad	53 (main muni.) 20 (outer villages)	1 205	500 m (main muni.) more in outer villages	70%	50%
Case #3 Göteborg	436	1 104	400 m	20%	60%
Case #4 Ystad	9 (main muni.) 10 (outer villages)	1 416	No target & not measured. No stations in historic inner city	50%	46%

The municipal role

While some actors saw the emergence of producer responsibility in Sweden as a means to partly overcome the municipal monopoly on household waste, municipalities in some cases saw a need to continue to be closely involved in the operation of the collection system. For case #4 (Ystad) where the municipality was not involved in collection, the primary rationale for its decision was a lack of existing infrastructure and an unwillingness to make new municipal investments on behalf of producers. In this regard, there was a desire to keep municipal fees and costs to a minimum and a lack of appetite to expose the municipality to business risks that such investments would entail.

For the other three reviewed cases where the municipalities were involved, a number of reasons were given respecting their motives for seeking out a role. The rationales can be grouped into the themes of coordination of producer responsibility with the municipal systems, environmental performance expectations and scale economy arguments.

Concerning coordination, wastepaper and packaging are not the only fractions of waste for which source separation is practiced and respondents expressed a need for coordinated delivery of all waste management services rather than have residents contend with multiple systems. A related concern that was also expressed was the legal responsibility for municipalities to prepare solid waste management plans for all wastes originating within a municipality under the Environmental Code. While there is a planning obligation for municipalities, there is a perception of a lack the capacity to effectively regulate how the system will operate where producers and private contractors control the collection system. The apparent lack of enforcement sanctions under the Packaging Ordinance likely contributes to the lack of confidence in a fully privatised system. Respondents also noted that when problems arise with the packaging system, consumers almost invariably look to municipal officials rather than producers.

Related to coordination concerns was the view that detailed local knowledge and experience gained over many years by the municipality was an invaluable resource that producers and their contractors lack. Further, where there have been established municipal investments in source separation infrastructure there can be powerful incentives to seek to protect both the investment and the trust of the public, which financed the earlier systems through household waste fees. While none of the profiled cases made specific reference to the issue, one could speculate that the provision of local jobs financed by revenues from producers which are external to the municipality would be and attractive proposal, especially in smaller less developed regions.

Higher environmental ambitions and a capacity to deliver on these ambitions were also noted as a rationale for a municipal role in collection. This rationale was expressed by each of the three profiled municipalities involved as collection contractors. By continuing to perform the collection function, municipalities can ensure that environmental expectations of political leaders and the public will be met and that problems will be resolved in a timely and effective manner. The potential for a lower environmental performance in reference to heavy vehicle traffic was alluded to by the fourth municipality (case #4, Ystad) where a number of private firms operate the collection system.

A final rationale behind a municipal role in collection was the opportunity to achieve cost savings through scale economies for collecting producer responsibility materials as well as household and other wastes. Illustrating this motive is the decision of Göteborg municipality to enforce an interpretation of 'household waste' to include wastepaper and packaging from all sources in the municipality, except for the Recycling Stations.

With respect to the material fractions that municipalities are most commonly collecting, as of April, 2005, fully 40% of Swedish municipalities (117 of 289) collect glass as primary collection contractors and 34% collect metal packaging. This compares to 27% for plastic packaging, 17% for wastepaper and 7% for paper-based packaging. Importantly, in all municipalities the material companies engage collection contractors under competitive bidding processes and a municipality will need to out-compete private contractors to win the business.

The comparatively high number of municipalities collecting glass and metal packaging as primary collection contractors presents an interesting question. The material companies indicate that municipal investments in collection equipment that pre-date the emergence of producer responsibility gives municipalities an advantage over private operators when bidding on collection contracts. This is surely one reason behind why these municipalities are able to out compete private operators in bidding processes, however it does not speak to the reasons that motivating the decision to undertake the work. In this respect both glass and metal packaging are non-combustible which raises the possibility that municipalities treating household wastes by incineration are seeking certainty that the source separation of these materials is well managed by retaining full control of the collection system.

A review of the household waste collection market in these municipalities indicates that about half of the municipalities that are collection contractors for glass and metal sub-contract out household waste collection rather than operate a municipal organisation for that purpose.[9] Since these municipalities do not operate municipally owned collection equipment for household waste collection, it seems unlikely that there would be interest in maintaining equipment solely for the purpose of the producer responsibility systems which suggests the possibility of alternate explanations. One explanation might be that glass and metal are non-combustible and municipalities treating household wastes by incineration are seeking certainty that the source separation of these materials is well managed by retaining full control of the collection system.

6.1.2 Financial mechanism

Collection infrastructure

For cases #1 through #3, the municipality either completely or in large part covered the construction costs for development of the Recycling Stations. Especially in the instance of Case # 3, Göteborg, this entailed a substantial investment in high quality facilities and a considerable amount of administrative costs and efforts to ensure that the facilities were conveniently located and all necessary building permits were obtained. While the outcome of this investment has been high quality collection infrastructure the fact that the system required unique lifting equipment restricted options when discussing a possible shift in ownership to producers.

In the case of land provision, municipalities and private landowners have agreed to provide required land for the stations at no charge and land rental costs are generally not paid. While this clearly has reduced direct costs for producers, the absence of an 'owner' for the stations has likely contributed to the litter problem since no actor has any real financial stake in maintaining cleanliness. If the stations were situated on land where a landowner operated the

[9] Data loaned from Swedish Transporters Association [Sveriges Åkeriföretag], in *Market for Collection of Household Waste* [Marknaden för insamling av Hushållsavfall], 2005.

station as part of a business enterprise based on rental revenues, municipalities could impose strict litter controls as a component of requisite building and business operating permits.

Since it was producers that opted for the 'bring' model, it is arguable that a more complete allocation of responsibility to producers that a refusal to provide municipal land free of cost would represent would serve several important purposes. First, landowners would have a financial incentive to invest in measures to prevent deposit of litter (video monitoring, station visibility & co-location with other high traffic services etc.) and unavoidable litter clean-up costs would by necessity become an element of the negotiation between landowners and producers. Also, facing clean up costs and potential closures of problem stations, which comes with a risk of non-compliance charges, producers would have real incentives undertake more effective information & consumer education initiatives respecting appropriate use of the stations.

Multi-family building collection

Respecting collection from multi-family buildings, it is noteworthy that for cases #1 and #2 (Lund and Halmstad) there is a substantial majority of multi-family buildings at some 70% that are served with on-site collection. Case # 4 (Ystad), where multi-family building collection is undertaken entirely by private actors has a smaller but still substantial 50% of buildings served. This suggests there is a willingness to pay for this service among building managers. However, this willingness is by no means universal and as noted in the Göteborg case, many building managers take the position that producers should bear all costs for collection and management of their products. Further, that there are legal challenges to Stockholm building requirements respecting provision of on-site collection facilities emphasises the determination of these actors to avoid responsibility for costs under the producer responsibility systems.

The means of financing the collection from multi-family buildings as raises an important issue concerning the overall objectives of the producer responsibility system. In the case of packaging, operators of the German Dual System for packaging indicate that the function of collecting materials can represent as much as 80 percent of overall system costs (Quoden, 2005). While recognising that the German and Swedish conditions are not directly comparable, it can certainly be said that the collection function under EPR systems for packaging represent a significant portion of the overall cost. Since building managers are paying private firms for collection service suggests that a substantial portion of the societal costs are not being carried by producers, but indirectly by consumers through their rent and/or building waste fees.

Producers have agreed to a voluntary target of service 75% of multi-family buildings in Sweden with this collection, which should provide the convenience of on-site service to roughly 45% of Swedes nation-wide based on housing patterns. Since the logic of producer responsibility relies on communication of an economic signal between the end-of-life management and the upstream product designers financing collection as a disposal fee will not support the objective of design change since producers will not perceive these costs. The German experience suggests that packaging can be recycled at comparatively low cost relative to costs for collection. Accordingly, encouraging design change in the form of reduced weight and bulkiness for packaging suggests that it is particularly important that producers bear the costs for collection rather than imposing these costs on downstream actors.

Irrespective of the issues of cost internalisation, there are barriers to the expansion of collection from multi-family buildings under free market conditions as advocated by producers. Firstly, the municipal monopoly over household waste prevents private collectors from offering co-collection of packaging together with household waste under a single

collection agreement unless the contractor is also collecting household waste on behalf of the municipality. This was seen in case #3 (Göteborg) where it was in the districts that private firms won the household waste collection contracts that they were also collecting packaging and waste paper from buildings.

A further barrier to the free market collection from buildings is the local monopoly granted by Pressretur for collection of wastepaper, which requires other firms to deliver wastepaper to the primary contractor. While Pressretur will have reasons for making these arrangements with collectors, this complicates the situation for other collectors as building owners will be faced with managing different contracts for each material type. The question of convenience for building owners dealing with only the municipality for all wastes is likely is one reason behind the comparatively high coverage in cases #1 and #2 (Lund, Halmstad) where some 70% of buildings are served on-site.

6.1.3 Information management

As described in Section 4.3, producers are required to consult with municipalities respecting the collection system and provide information to municipalities which are in turn required to provide the relevant information to consumers about their role under the system. In all the profiled cases the municipalities were discharging their information responsibility although for case #4 (Ystad) the communication effort was noted as limited.

With respect to the information responsibility concerning the local collection system, there can be good arguments for a local government role. Because of the long standing role of local governments in household waste management they enjoy good contacts with consumers, who in turn look to local governments for waste related issues. Further, because the producer responsibility systems do not operate entirely independent of the general waste system, information respecting wastepaper and packaging can be provided in tandem with that for other wastes. However, while larger municipalities will have resources at their disposal to discharge this responsibility effectively, resources were considered as a limitation in the comparatively smaller municipality of Ystad (case #4). While being home to only 27 000 residents it is worth noting that Ystad remains more populous than over 200 of Sweden's 289 municipalities, which together have a combined population of some 2.6 million. These numerous but small municipalities are unlikely to have substantially greater resources at their disposal for consumer information purposes.

The question of resources for consumer information could be seen from the perspective of one of the main rationales behind producer responsibility, specifically to bring new resources to bear on waste issues. In this respect, there are few actors in society with a greater capacity to inform and influence consumer behaviour than consumer goods producers and print media and there is no reason the resources of these actors could not be applied to waste and recycling issues.

6.2 Recovery

6.2.1 Physical management

As the quality of sorting for materials delivered to recovery operations is a condition upon which the material companies base payment to collection contractors, collectors have invested in sorting facilities to maximise the value of collected materials. Accordingly, of the municipalities profiled in this thesis which are serving as primary collection contractors,

Halmstad and Göteborg (#2 and #3) have made significant investments in post-collection material sorting facilities and the third (case #1 Lund) operates a more semi-formal sorting for metal packaging. The sorting facilities in cases #2 and#3 are also providing sorting services for other material streams for which the municipalities bear responsibility and in case #2 there are business revenues being earned from commercial sorting contracts. This supports the scale economy argument as a rationale for municipalities engaging as contractors under the producer responsibility systems.

In all profiled cases, the primary collection contractors either had access to a regional consolidation point in the vicinity of the municipality or long distance transportation was arranged by the material company (e.g. GlasÅtervinning).

Aside from post-collection sorting, no profiled municipality was engaged in actual recovery or recycling of collected materials, however given that soft plastics are recovered as a fuel, municipal waste-to-energy plants will fulfil the recovery function for this material stream.

6.2.2 Financial mechanism

As noted in the above section, the contract terms from the material companies provide collectors with incentives to maximise the quality of collected materials. While this will encourage attention to quality on the part of collectors, the question of basing payment on material sorting quality presents possible difficulties from the perspective of municipalities.

First, there can be competing objectives of municipalities and the private sector. As illustrated in case #1 (Lund), when the municipality was acting as a collection sub-contractor for plastic packaging the quality standard imposed by the primary collection contractor resulted in payment being refused in many cases for the collected plastic packaging. In these cases, the municipality was forced to dispose the material together with household waste. Because investments in collection infrastructure had been made and consumers had become accustomed to source separating plastic packaging, the municipality was left with little choice but to accept the terms of the primary collection contractor and continue to collect materials with little or no payment.

The experience of Lund in this respect points to the issue of relative bargaining power of municipalities as compared to producers when negotiating collection agreements. Because municipal waste organisations are answerable to political leaders and the public, political pressures can come to bear to ensure collection is handled to the expectations of the public, regardless of the financial aspects of collection contracts. While a desire for a higher standard of environmental performance was a strong theme in the studied cases for a municipal role in collection, there is a potential that this could be exploited by the material companies during negotiations with municipal collectors. In fact, it could be said that the material companies would be negligent in their role as representatives of producers if they did not exploit every opportunity to secure the least cost collection service provider.

The issue of enhancing bargaining power was one of the motives stated in case #1 (Lund) respecting the municipality's aim to retain ownership and control over the collection infrastructure. The municipality indicated that by maintaining full control of the infrastructure they would as a minimum be secure in negotiating open market prices for the metal, paper and clear glass fractions which can be sold over private markets independent of the producer responsibility systems.

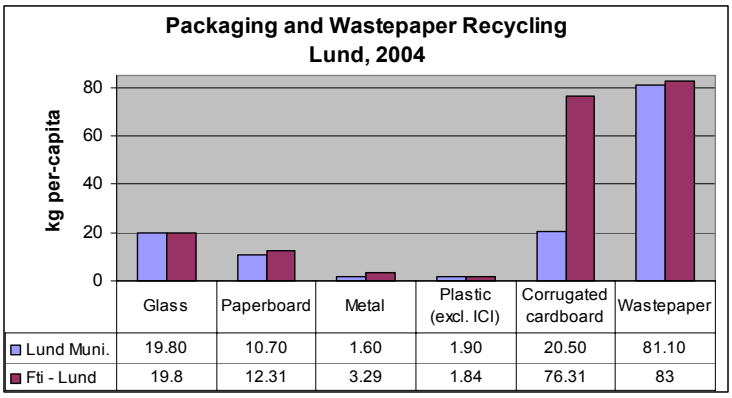
Further weakening the negotiating stance of municipalities is the geographical restriction imposed under Swedish Local Government Act, which prohibits municipal organisations from conducting business outside the municipal boundary. Because of this restriction, municipal investments in collection or other infrastructure cannot be lawfully deployed elsewhere which creates a powerful incentive to ensure resources continue to be utilised over time. As producers engage collectors under competitive bidding processes, there is a risk that municipalities will turn to household waste fees as a means to support a low bid for the producer responsibility contracts. That there are complaints from the private sector concerning abuses of the municipal monopoly over household waste suggests this is indeed occurring. While competition policy is not a focus of this thesis, subsidising the collection of producer responsibility materials through household waste disposal fees will have implications for the overall outcome of the system as producers will not perceive the full cost of end-of-life product management.

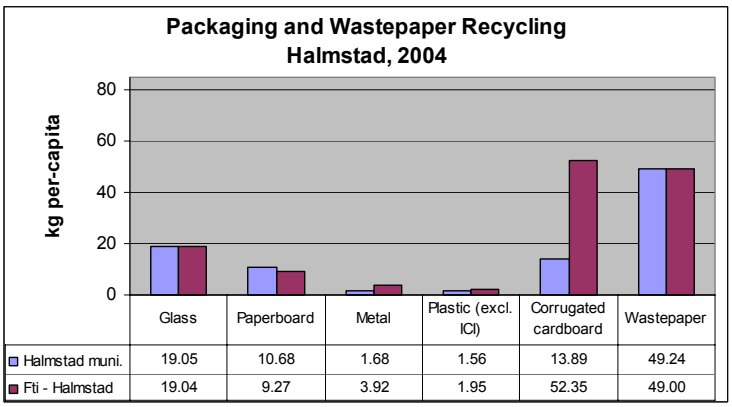
6.2.3 Information management

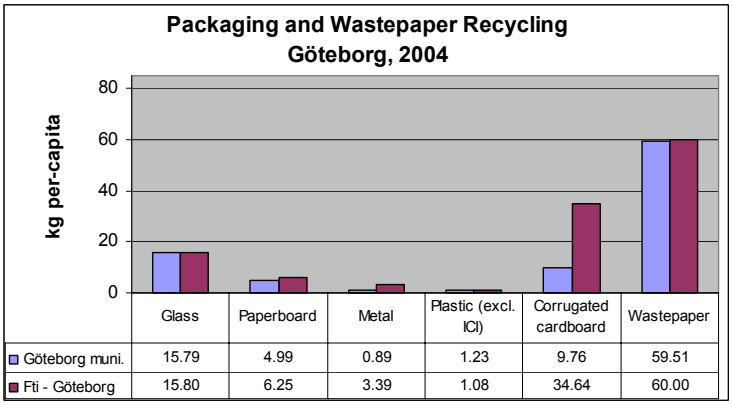
As described in Section 4.3.2, producers have an obligation to provide information to the Swedish EPA concerning the recovery and recycling of wastepaper and packaging. Producers also provide information to municipalities concerning the results of the local source separation system, which the municipalities in turn report to consumers. In its annual report entitled 'Collect, and Recycle!' the Swedish EPA publishes the results of all producer responsibility systems in Sweden. As described in Section 4.3.2, the overall collection and recycling rates are quite high with the exception of plastic packaging which lags significantly behind.

While national level statistics are provided by the EPA, results at the municipality level are reported by producers through FTi, as well as by many municipalities. Comparing the results reported by municipalities and producers reveals some significant discrepancies, particularly for corrugated cardboard and metal packaging, for which results can differ by up to a factor of four. For the other material types, there are smaller differences, which could possibly be attributed to the source of the population figures used to arrive at a per-capita result. For the larger differences in reported results, none of the municipalities could explain the difference, although the issue was noted as a known problem. Producers indicate the differences can be attributed to the fact that municipalities do not have access to results for materials collected by private operators (Georgsson, 2005). This assertion is supported in part by the fact that in most but not all instances the producer figures are greater than the results reported by municipalities.

Figure 6-1 presents total recycling statistics as reported by the municipalities and converted to per-capita results based on municipal population at December 31, 2004 together with the per-capita figures reported by FTi for cases #1 through #3. Case #4 (Ystad) did not publish wastepaper and packaging results and producer figures are presented as a means of comparison with the other municipalities. Note that for plastic packaging, producers report only the packaging collected from householders at the municipal level.







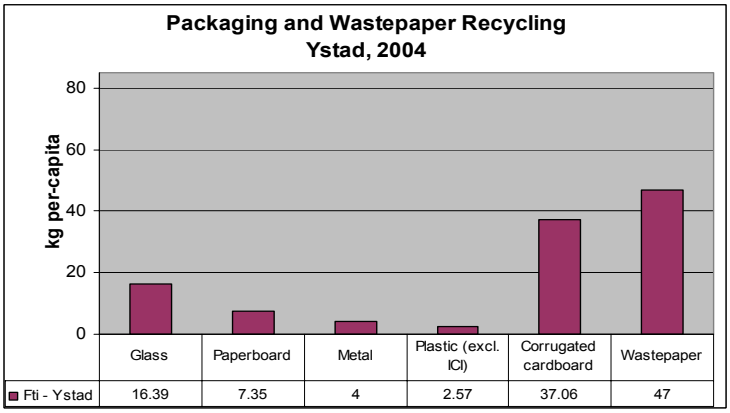


Figure 6-1 Per-capita results reported by municipalities and producers

Sources: Producer figures FTi, 2005a except for wastepaper result, Pressretur, 2005. Municipal figures modified from LRV Annual Report, 2005, HAB Annual Report, 2005, Göteborg Kretslopp Annual Report, 2005

At a minimum the rather significant differences between the municipal figures and those reported by producers makes an evaluation of collection performance between municipalities uncertain. A further complication is that household and commercial results are reported at the local level as a single figure by producers for all materials, save for plastic packaging. Because some commercial activities can generate large quantities of packaging wastes relative to householders, an evaluation based solely on total quantities of collected materials will be an unreliable indicator. While municipalities may in some cases delineate between commercial and household sources (e.g. case #2 Halmstad) when reporting, the methods used by various municipalities to gather date are unlikely to be uniform. A further complication is the fact that collection from commercial sources under market conditions (e.g. corrugated cardboard) there is a possibility that non-municipal actors at times fail to report collected materials to the relevant authority/agency.

Quality and comparability of waste statistics is a well known problem. At the EU level, a 2002 regulation on waste statistics (Regulation EC 2150/2002) sought to ensure comparability of waste data reported by member states. To ensure the quality of reported data, a further regulation coming into force in September 2005 (Regulation EC 1445/2005) imposes requirements for member states to produce quality reports on reported data (Environment Dailey, 2005). There should be no reason why waste data in Sweden cannot be similarly regulated to provide a measure of confidence in the results. Nonetheless, the disagreement between figures reported by municipalities and producers make the data an unreliable a basis upon which any reasonable conclusions can be drawn respecting the relative performance between municipalities and between municipal and private collection contractors.

6.3 Monitoring and Enforcement

As described in Section 4.3, municipalities hold responsibility for the wastepaper and packaging systems. This responsibility includes ensuring that producers fulfil their duty to consult with municipalities, provide information and operate a suitable return collection system and to ensure consumers meet their source separation duties. While the EPA noted that there are in reality limited means for municipalities to enforce the source separation requirement for consumers, litter at Recycling Stations is one issue to which both municipalities and producers have directed resources. As noted in Section 6.1.1, the number of actors and the shared responsibility for the overall operation of the system among different material companies can lead to questions respecting responsibility for the overall system.

Aside from a lack of clarity concerning accountability for the system, according to the EPA municipalities are also in a position that there is no statutory sanction at their disposal to take enforcement action against a producer. While there are non-statutory measures that have to date ensured producers participate with the material company systems, the absence of accessible enforcement tools at the local level has surely contributed to municipalities seeing a need to remain involved in collection to ensure a functioning system.

6.4 Concluding discussion

This thesis was focussed on examining rationales behind municipalities playing roles under the Swedish EPR systems for wastepaper and packaging and the experiences of four municipalities were profiled. While this study was not designed to evaluate the relative capacity of municipalities to more efficiently and effectively deliver various functions relative to private sector actors, some observations can be made on the issue.

Municipal vs. private sector collection

Firstly, with respect to the relative performance of the profiled cases, direct comparisons based solely on collection results are problematic given the problem of commercial activities skewing results. However, because plastic packaging from households is likely the most problematic material stream from the perspective of source separation & contamination problems, good collection and recycling performance for plastic can be seen as one indicator of overall performance of the local system. Recognising that many factors will influence recycling results Figure 6-2 is presented to illustrate the results reported by the municipalities and producers for household plastic packaging. The national average of 1.69 kg per-capita as reported by FTi is also presented to relate each municipality to the national average.

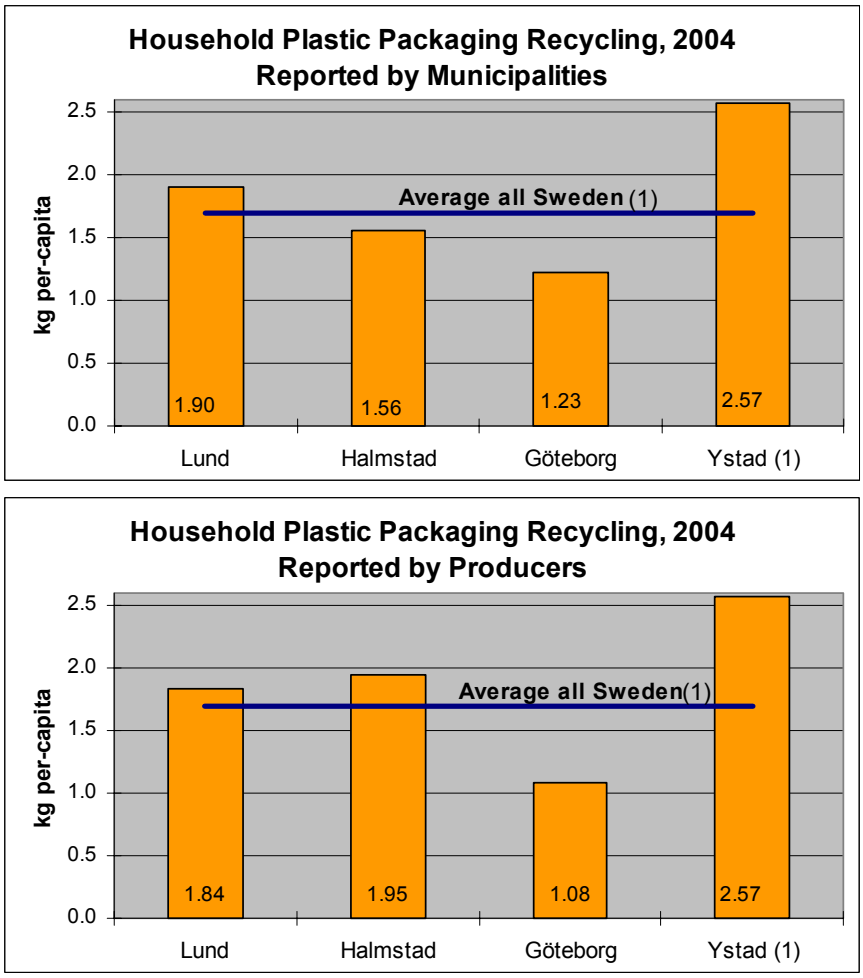


Figure 6-2 Plastic packaging from household sources

Sources: Producer figures FTi, 2005a.
Municipal figures modified from LRV Annual Report, 2005, HAB Annual Report, 2005, Göteborg Kretslopp Annual Report, 2005, except for (1) FTi, 2005a

The sample size here is very limited and no reasonable generalisation can be made respecting the relative performance of municipal vs. private sector actors from this data nor between the four municipalities. The result under the private collector in Ystad is clearly much higher than the other cases and it is unlikely that local packaging consumption differences between the municipalities alone could explain the rather large difference. In this respect it is worth noting that Ystad is home to a significant plastic industry that is engaged in, among other things,

plastics recycling activities and there exists a substantial potential for materials from these activities skewing the reported results. Another noteworthy observation is the comparatively low result for plastic in Göteborg (Case #3) in both the municipal and producer figures, despite an apparent high environmental ethic among Göteborg residents and the reported heavy investments in high quality convenient collection infrastructure.

While in principle the results for plastic packaging collected from households could be a useful indicator of the overall local packaging collection performance, the uncertainty connected with the data reported by municipalities and producers make it impossible to draw any conclusions based on these statistics. Further even if the data were reliable, it must be emphasised that a sample size of just three municipal collectors and one private sector collector would be insufficient to draw any meaningful conclusion.

With regard to the data it is important to emphasis that this thesis was designed to qualitatively explore the rationales and experiences of municipalities engaged as collectors under producer responsibility systems. The thesis was not designed to evaluate the relative performance of the private sector relative to public sector collectors of wastepaper and packaging, which would require a far larger sample size and an investigation of performance and results over a period of time. Nonetheless, these results confirm the findings of others that the poor quality of waste statistics makes any performance evaluation problematic and unreliable. As noted in Section 6.2.3 there should be no reason why the problem of the reliability of waste statistics cannot be resolved.

Waste prevention & design change

A second relevant observation respecting the municipal role under the producer responsibility systems is related to the question waste prevention. While it is very apparent that there has been a well organised effort to develop an effective collection and recycling system, one could pose questions as to the degree to which producers truly assume responsibility for their products. Respecting the Recycling Stations, land is provided by municipalities and others at no cost, municipalities have assumed responsibility for construction and maintenance costs and consumers are required to transport sorted wastepaper and packaging at times considerable distances. Where convenience is being increased through collection direct from multi-family buildings it is consumers, through building managers, who pay the collection costs for this service. Municipalities today assume full responsibility for informing consumers about the source separation system. These compromises could be characterised as an equitable distribution of responsibilities in the spirit of cooperation between various actors. However there is a need for a reconsideration of the policy objectives behind the producer responsibility systems and how these compromises do or do not support those objectives, particularly concerning design change.

In this respect it is interesting to consider the 1999 study by Marian Radetzki, which calculated consumer time for sorting and transportation of packaging at 1 660 (€178) annually on a household basis, concluding that the producer responsibility systems were exceedingly uneconomical. Radetzki was right that there are costs associated with the source separation efforts of consumers. However rather than treat these costs as arguments against the packaging recycling effort, it could also be concluded that the time costs for consumers are an indication of an inadequate system developed by producers and that increased convenience is justified. While increasing convenience will imply greater producer costs, the efforts and time costs on the part of consumers would decrease while at the same time the collection system would become in itself an instrument to stimulate design change.

Trade and competition issues

As noted in Section 4.3, private sector waste management firms complain that municipalities are abusing their monopoly position over household waste and are competing under subsidised conditions in the private marketplace for commercial wastes. In this respect, the Swedish Competition Authority is firm and clear that there is presently no legal basis for municipalities to compete against the private sector in this regard and regulatory measures on this issue seem likely to emerge in the future. Should the legislation expected in autumn 2005 to regulate public sector actors in the marketplace reflect the view of the Competition Authority, significant implications that extend far beyond the producer responsibility systems can be expected. At a minimum, there will likely be accounting and cost allocation implications for municipalities offer their services in the marketplace and there is a possibility of a strict prohibition against public actors competing in the market altogether.

The question of market competition in the waste sector and the involvement of the public sector raises an interesting question respecting the international trade in post-consumer commodities. There are significant differences in the degree of responsibility assumed by producers in different countries and in many cases there are public actors involved in collection and other functions. Just as Swedish waste firms complain about municipalities competing under subsidised conditions, so might jurisdictions where producers more fully assume responsibility for products complain that subsidies in exporting countries are distorting markets for post-consumer commodities. While there has been considerable attention to the issue of market entry barriers that EPR legislation might pose for import products, the question of subsidies and international trade in post-consumer commodities has not received attention. As trade in recycled commodities grows over time the question of how international trade agreements treat municipal or other subsidies under producer responsibility systems will need to be resolved.

Summary

This thesis summarised the Swedish EPR systems for wastepaper and packaging and explored the experience of three municipalities where there is a municipal collection contractor and one with fully private sector collection. While the information and analysis presented here touches on the issue of the effectiveness of private sector vs. municipal collection of wastes, the thesis was not intended to evaluate the relative performance of municipal and private sector waste collectors. The objectives were to (1) explore and analyse the rationales behind local government involvement in the EPR systems and (2) explore and analyse the consequences of this involvement.

In this regard, some observations can be made concerning involvement of municipalities under producer responsibility systems, especially concerning the broader objectives of waste prevention and design change, which under producer responsibility systems depends on a market based signal communicated to producers. Where municipalities are engaged by producers for various functions, the interests of producers to secure least cost collection and the interest of municipalities to provide good service to local consumers can result in subsidisation of collection. While this may be justifiable at the local level in terms of local collection and waste recycling performance, the broader goals of waste prevention and design change will not be supported. On this basis, the information compiled in this thesis suggests that a discussion would be worthwhile around the overall desired policy objectives being pursued by the producer responsibility systems and the actors which are best placed to deliver these objectives.

6.5 Suggestions for further research

Public vs. private collection performance.
A theme of this thesis has been the role of municipal waste management organisations in colleting materials under the producer responsibility systems. In principle, given sufficient incentives there should be no reason for private sector collectors to be any more or less effective than municipal collectors. Acknowledging the questions respecting the available statistics for wastepaper and packaging in Sweden, it would be worth investigating the overall performance over time of private vs. public actors in Sweden. Should any general trends be observed, the reasons behind the differences should be explored.

Municipal scale economy.
The argument of municipalities achieving scale economies by collecting producer responsibility materials as well as household wastes seems a compelling argument in favour of a municipal role in collection. Conversely, there are powerful arguments in favour of market competition in the waste sector which economics suggests will lead to long term cost reductions and improvements in service. The potential benefit of greater economies of scale at the municipal level should be investigated in order to compare these benefits against the potential for efficiencies of a liberalised market for the producer responsibility materials.

Source separation and collection close to the home.
In two of the four cases examined in the thesis, respondents noted a more compete source separation and higher quality sorting effort by consumers when collection takes place close to the home. A third case (case#2) did not identify a higher quality sorting effort, it was noted that the financial incentive provided by more costly collection of general household waste provided an incentive for more complete source separation and increased collection quantities. Accordingly, these rather anecdotal observations should be investigated to identify the degree to which collection directly from residences increases the source separation performance of consumers.

International trade and post-consumer commodities.
The question of how municipal subsidies for collection of post-consumer commodities would be treated under international trade agreements is an area that does not appear to have been investigated in any detail to date. Accordingly, a clarification of how international trade agreements are likely to treat this trade would be of interest.

7 Conclusions and Recommendations

By exploring the experience of municipalities under the Swedish EPR systems for wastepaper and packaging, the thesis sought to explore rationales behind local government involvement in the EPR systems and analyse the consequences of this involvement.

7.1 Research questions

Three research questions were posed:

Research question #1: In what ways are Swedish local governments participating in Swedish EPR systems for wastepaper and packaging?

1. Swedish municipalities have legal responsibilities to consult with producers concerning the local collection system, provide information to consumers respecting their source separation responsibilities and enforce the wastepaper and packaging ordinances.

2. 40% of Swedish municipalities (117 of 289) have won collection contracts for glass packaging as primary collection contractors and 34% collect metal packaging. This compares to 27% for plastic packaging, 17% for wastepaper and 7% for paper-based packaging.

   The number of municipalities collecting glass and metal suggests municipalities may be seeking certainty that source separation of these materials is well managed given the possible impacts on incinerators and health risks from broken glass in household waste.

3. Municipalities have provided land for the network of Recycling Stations generally at no charge to producers. This may have led to increased problems with litter as there is no actor with a direct financial interest in maintaining cleanliness.

4. Municipalities that are engaged as primary collection contractors by producers have invested in infrastructure for the Recycling Stations (containers, collection vehicles) and in some cases post-collection sorting facilities.

Research question #2: What are the rationales and objectives behind local government delivering functions under Swedish wastepaper and packaging EPR systems?

5. Municipalities perceive a need to ensure coordinated delivery of all waste management services within a municipality. This perception is amplified by the municipal obligation under the Environmental Code for solid waste planning and the lack of effective legal tools to regulate local collection service provided by producers.

6. There can also be a perception that municipal actors are capable of delivering higher environmental performance due to local knowledge issues as well as the differing motives of private actors. By continuing to perform the collection function, municipalities can be assured that environmental expectations of political leaders and the public will be met.

7. Where there are legacy investments in source separation infrastructure that pre-date the emergence of producer responsibility municipalities are seeking to protect their investments and the public's trust by continuing to operate the local collection system.

8. The comparatively large number of municipal organisations engaged as primary collection contractors for glass and metal suggests a potential lack of confidence in relying entirely on private sector collectors.

9. Municipalities are also seeking to achieve scale economies by collecting wastepaper and packaging as well as regular household wastes.

Research question #3: What has been the experience of Swedish local governments in delivering functions under the producer responsibility systems?

10. Because of bargaining power and competitive pressures, municipal organisations can be challenged to negotiate contracts with producers sufficient to meet local needs and ambitions, resulting in financial losses which must be recovered by other means such as household waste fees. Political pressures can come to bear on municipal organisations to continue to provide quality collection services irrespective of financial aspects of contracts (e.g. litter), serving to insulate producers from the full costs of the producer responsibility system.

11. Municipalities have in some cases benefited from collecting materials under the producer responsibility systems by deriving new financial resources from producers and through scale economies. This is particularly the case where private sector actors do not possess local resources and municipalities are able to negotiate favourable collection contracts.

    Other benefits have been cases where municipal investments in sorting equipment under the producer responsibility systems are being put to use for other purposes including commercial waste sorting thus earning revenues for the municipal organisation.

7.2 Implications for EPR policy

The unique feature of EPR policy is its capacity to stimulate design change by shifting responsibility for product end-of-life management away from municipalities upstream to producers. On the understanding that the stimulus for design change for producers is maximised through full cost internalisation of end-of-life costs, the following recommendations are made concerning the role of municipalities:

1. Where municipalities are performing collection or other functions, this work should be undertaken under market conditions to ensure competitive pressures are brought to bear to keep system costs to a minimum. However, because producers will seek to minimise costs and recognising the issues of bargaining power discussed in Section 6.2.2, municipalities should be scrutinised to ensure that work undertaken on behalf of producers is not subsidised through household waste disposal fees. This should ensure that producers continue to bear all costs for managing their products and provide appropriate incentives for producers for stimulation of innovation and product system design changes.

2. Swedish municipalities are tasked with planning and implementing solid waste management plans, but lack capacity to effectively deliver on this responsibility for wastepaper and packaging under the producer responsibility systems. This suggests a need for a consistent policy environment in terms of regulatory tools to direct the local implementation of the producer responsibility system or explicit relief from responsibility for producer responsibility materials for municipalities.

3. Recommendation # 2 suggests a need to define measurable performance indicators at the local and national levels. While a feature of EPR policies has been to provide flexibility to producers in meeting targets, an absence of local performance measures could reduce confidence in the actual performance of the producer systems. Clear and measurable local performance measures that producers will be responsible for achieving could be agreed between produces, national and local authorities. Where performance is insufficient, enforcement authorities should be empowered to take action.

4. Given that market competition policy in Sweden and elsewhere is likely to move toward more liberalised approaches, developing capacity within municipalities and at other levels to effectively regulate private actors in delivering waste and recycling functions is likely to yield better results over time than striving to deliver these functions directly.

7.3 Recommendations relevant to the profiled cases:

5. As a means to stimulate design change on the part of producers the EPA should consider defining a level of service that producers are required to provide and take measures to ensure a more full cost internalisation of system costs. Approaches such as charges and fees collected from consumers at the point of disposal (e.g. from multi-family buildings) should be discouraged.

6. Given the potential for significant changes in the legal environment within which municipalities operate following the anticipated competition legislation, the Swedish EPA should work with the Competition Authority to clarify and plan any required transition within the producer responsibility systems. This is particularly relevant for glass and metal packaging which involve municipalities in collection to a large extent.

   Discussions with the Competition Authority present the EPA with an opportunity to seek clarification respecting municipal and other subsidies under EPR systems and implications for international trade in post-consumer commodities.

7. There is a need for reliable wastepaper and packaging collection and recycling statistics at the municipality level. As a minimum the data should enable an evaluation of collection performance across different municipalities. Because commercial activities can skew results, this also implies a means of distinguishing between commercial and household sources.

   Should there be a substantial restriction on public sector involvement under the producer responsibility systems under the anticipated competition legislation, the need for reliable statistics is even more acute as municipalities will be seeking assurance that the producer responsibility systems are functioning at the local level. If there are perceptions of problems, municipalities will feel compelled to intervene, as has been the case to date respecting litter at Recycling Stations.

Bibliography

Building Sector Ecocycle Council - Byggsektorns Kretsloppsråd, 2005 http://www.kretsloppsradet.com/Some_history.asp Accessed 2005 June 29

Business and Industry Advisory Council (BIAC) to the OECD, 1998, *BIAC Statement to the OECD EPR Workshop 3 on Extended and Shared Responsibility for Products* in OECD, 1998

Environment Daily 1939, 13/09/05 Further rules on EU waste statistics published

European Environment Agency, 1997, Environmental Agreements Environmental Effectiveness, Case studies Environmental Issues Series 3 Volume II Online http://reports.eea.eu.int/92-9167-052-9/en/vol_ii.pdf Accessed 2005 July 31

Förpacknings- och Tidningsinsamlingen , 2005 (a) http://www.ftiab.se/ 2005 July 7

Förpacknings- och Tidningsinsamlingen, 2003, *Förpackningsinsamlingen 2002 Annual Review*

Förpacknings- och Tidningsinsamlingen, 2005 (b) http://www.ftiab.se/omfti/samordningsentreprenorer.4.14da86b102a742c2528000181.html 2005 July 20

GlasÅtervinning, 2005 http://www.glasbanken.com/main.html

GlasÅtervinning, Fakta 2005 http://www.glasbanken.com/main.html 2005 July10

Göteborg Department of Sustainable Water and Waste Management, 2005 [Göteborgs Stad Kretslopp Verksamheten, 2004] online: http://www.kretslopp.goteborg.se/BinaryLoader.aspx?ObjectID=567&PropertyName=FileList&PropertyValue Index=1&CollID=File [accessed 2005 June 27]

Göteborg Department of Sustainable Water and Waste Management, Annual Report, 2004 [Göteborgs Stad Kretslopp Verksamheten, 2004]

Hartlen, Dr. Jan, 1996 Swedish Geotechnical Institute, S-58193 Linköping. Waste Management in Sweden 1996 in Waste Management Vol 16 Nos 5/6 pp 385-388 1996

Jobin, Bengt, 1997, Swedish Confederation of Industry, in OECD, 1997

Lindhqvist, 2005 – Recycling Council of Ontario Conference Proceedings EPR Evaluation Tool

Lindhqvist, Thomas 2000, Extended Producer Responsibility in Cleaner Production – Policy Principle to Promote Improvements of Product Systems, IIIEE Dissertation 2000:2

Lund Municipality Homepage, 2005 http://www.lund.se/templates/Page____3326.aspx 2005 July 8

Lund Sanitation Department Brochure: Fees, 2005

Mattsson, Cecilia och Berg, Per E.O. Hushållsavfall i Borlänge kommun. Analyser av material en- och flerfamiljshus. EKOS PUBLIKATION 2000:2. INTERNSKRIFT (2000) in Mattsson, 2003.

Mattsson, Cecilia, 2003 Waste Management and Producer Responsibility in Sweden, Chalmers University of Technology Göteborg, Sweden, 2003 report No. 2003:5 Department of Mathematics, Science and Engineering, Dalarna University College Borlänge, Sweden Thesis for the degree of licentiate of Philosophy

Mattsson, Cecilia, and Berg, Per E.O., 2000 Collection of Household Waste, Sweden, in Mattsson 2003

Mattsson, Cecilia, Berg, PEO. Hushållsavfall i Falun. Analyser av material en- och flerfamiljshus. EKOS PUBLIKATION 2000:3 INTERNSKRIFT. Borlänge (2000) in Mattsson, 2003

Natural Step Newsletter - Stepping Stones .33 Stepping Stones, No. 33 (October 1999) www.naturalstep.org.uk/issue_33.pdf[Accessed 2005 June 29]

OECD, 1997, Conference Proceedings, Extended Producer Responsibility: Who is the producer?, 2-4 December 1997 Chateau Laurier Conference Center Ottawa, Canada

OECD, 1998, Extended and Shared Producer Responsibility Phase 2 Framework Report

OECD, 1998, Conference proceedings, *OECD Workshop on Extended Producer Responsibility: Who is the Producer?* Ottawa, Canada, December 2-4, 1997 Online: www.epa.gov/epaoswer/non-hw/reduce/ottawa.pdf [accessed 2005 July 5]

OECD, 2001, *Extended Producer Responsibility A Guidance Manual for Governments*

Mattsson (Petersen), Cecilia H. and Berg, Per E.O., 2004, Use of recycling stations in Borlänge, Sweden – volume weights and attitudes in Waste *Management* 24 (2004) pp 911-918

Plastkretsen, 2005, '*Information in English - The recycling of plastic packaging saves our environment'* www.plastkretsen.se

Pressretur, 2005 Insamlingsstatistik Online http://www.pressretur.se/sv/(05)kommuninfo/index.asp

Radetzki, Marian (1999) "Recycling — Not Worth the Effort — An ESO Report on Municipal Waste", ESO, Stockholm in OECD, 2001, Encouraging Environmentally Sustainable Growth in Sweden, Deborah Rodeveare

Reparegistret AB - REPA, 2004 (a) Newsletter 2004-04 http://www.repa.se/global/docs/newsletter2004-04.pdf Accessed 2005 July 2

Reparegistret AB - REPA, 2004 (b) How to Join REPA http://www.repa.se/global/docs/Engelsk%20delg%209901.pdf 2005 July 5

Reparegistret AB - REPA, 2005 (a) REPA's Instructions http://www.repa.se/global/docs/REPAs%20Instructions.pdf Accessed 2005 July 2

Reparegistret AB - REPA, 2005 (b) Newsletter 2005-01 http://www.repa.se/global/docs/newsletter2004-04.pdf Accessed 2005 July 2005 http://www.repa.se/global/docs/newsletter2005-01.pdf

Returpak, 2005 Accessed 2005 June 30 Online - http://www.returpack.se/

RVF-Svenska Renhållningsverksföreningen - The Swedish Association of Waste Management, 2003, Swedish Waste Management, 2003 available http://www.rvf.se/se/netset/files3/web/P01.m4n?download=true&id=147_76842222 Accessed 2005 June 4

SCB Statistics Sweden, 2005 b http://www.scb.se/templates/tableOrChart____30452.asp

Statistics Sweden SCB, 2005 a Statistica Centralbyrån http://www.scb.se 2005 Accessed 2005 Jun 25

Sveriges Åkeriföretag, 2005, Market for collection of Household Waste [Marknaden för insamling av Hushållsavfall], 2005, Author Jonas Ynger,

Swedish Association of Environmental Health Professionals, 2005http://www.ymh.se/swedinfo.php accessed 2005 June 25

Swedish Association of Local Authorities and Regions-SALAR, Levels of local democracy in Sweden Accessed 2004 June 22 http://www.skl.se/artikeldokument.asp?C=756&A=180&FileID=70871&NAME=F%E4rdigbroschyr%5FENG%5F612.pdf

Swedish Environmental Protection Agency (a) -Naturvårdsverkhet, Producer Responsibility 2005 June 13 http://www.internat.environ.se/documents/issues/prodresp/prodresp.htm

Swedish Environmental Protection Agency (b) -Naturvårdsverkhet, Producer Responsibility for Packaging, 2005 June 13 http://www.internat.environ.se/documents/issues/prodresp/packag.htm

Swedish Environmental Protection Agency (c) -Naturvårdsverkhet, Producer Responsibility for waste paper, 2005 http://www.internat.naturvardsverket.se/documents/issues/prodresp/wastepap.htm 4 July 2005

Swedish Environmental Protection Agency (d) Collect and Recycle! (Samla in, Återvin!), summary results for 1996, 1997, 1999 through 2004 provided by fax.

Swedish Environmental Protection Agency, 2003 Summary of 'Resources in Return: A Review of Sweden's EPR Programmes', in Proceedings OECD Seminar On Extended Producer Responsibility: EPR Programme Implementation And Assessment Part 1: Taking Stock Of Operating EPR Programmes OECD, 13-14 December 2001

Swedish Ministry of Sustainable Development, 2003, Summary of Government Bill 2002/03:117 on Ecoefficient Society. Online available http://www.sweden.gov.se/content/1/c6/02/20/65/e3166930.pdf Accessed 2005 June 29

Tojo & Hansson, 2003) Political Economy for Implementing EPR Based Policy Instruments in OECD, 2004, Economic Aspects of Extended Producer Responsibility

US Council for International Business, 1997 in OECD, 1997

USEPA, 1998 Extended Product Responsibility Through Voluntary Partnership, Clare Lindsay in OECD, 1998

Vukicevic, S., Retzner, L., Törner, T., Ohlsson, T. 2001 Characterisation of Waste from Swedish Households [Karakterisering av avfallsflödet från svenska hushåll] in Mattsson, 2003

Personal communication

Municipality of Lund:

Göthe, Anna Wilhelmsson, Head, Environment and Marketing Section, Lund Sanitation Department, Lund Municipality, Traktorvägen 16, Lund, 5 July 2005, 13:15 – 14:30

Kristensen, Johnny, Environment and Marketing Section, Traktorvägen 16, Lund 5 July 2005, 13:15 – 14:30

Municipality of Halmstad:

Ålund, Per, Marketing Manager, Halmstads Renhållnings AB, Kristinehed, Halmstad, personal communication August 10, 2005 e-mail per.alund@renhallningsbolaget.se tel 035-190 194

Sjölin, Greta Halmstads Renhållnings AB, Kristinehed, Halmstad, personal communication August 10, 2005 e-mail greta.sjölin@renhallningsbolaget.se

Municipality of Ystad

Wiking, Ronny, Ystad Technical Service Department, personal communication 2005 July 21 tel 0411577167

Lundsgard, Mats, SITA Sverige AB, telephone interview 2005 Aug 24 tel +46431444056 mats.lundsgard@sita.se

Andersson, Jan, Stena Scanpaper AB, Eslöv, telephone interview jan.c.andersson@stenametall.se +46413-184 04 2005 August 23

Ydsten, Alf, Stena Scanpaper, telephone interview, 2005 July 28 09:30

Kristiansson, Peter Ekdahls Åkeri AB, telephone interview 20054 Aug 26 +46406806250

Municipality of Göteborg

Andersson, Kaj, Managing Director, Göteborg Stads Kretslopp, personal communication August 11, 2005

Antoni, Bo Projektledare, Göteborg Stads Kretslopp, personal communication August 11, 2005

Lindman, Kurt, Renova, telephone interview, 2005 Aug 22

Simonsson, Jan, Renova, telephone interview, 2005 Sep 5

Other:

Fredriksson, Gunnar, 2005 a, Swedish EPA, Naturvårdsverket telephone interview, 2005 July 22 2005 9:45 am

Fredriksson, Gunnar, 2005 b, Swedish EPA, Naturvårdsverket telephone interview, 2005 August 3 3:15 pm

Ynger, Jonas Consultant, Consultant, Representing the Swedish Recycling Industries' Association – Återvinningsindustrierna - Personal Communication, July 4, 2005 9:00 am

Ankers, Mikael, 2005a Managing Director, REPA, telephone interview, 2005 July 5 09:15 hr

Strand, John, Managing Director, Förpacknings- och Tidningsinsamlingen 2005 September 1 telephone interview 09:40 hr tel +46 8 566 144 00

Cronhult, Pär Chief Legal Advisor, Swedish Competition Commission, telephone interview tel +46 08-545 03 818

Sundbom, Per-Arna, Swedish Competition Authority telephone interview 16 Aug 2005 tel 0737731619

Audelius, Bo, 2005, RVF – The Swedish Association of Waste Management [RVF - Svenska Renhållningsverksföreningen] telephone interview, +46 40-35 66 14 2005 Sept 5

Jacobsson, Lena, Swedish EPA, telephone interview tel 08-698 11 67, Lena.Jacobsson@naturvardsverket.se 2005 Sept 7 15:40 hr

Westin, Erikk, 2005, Swedish EPA, telephone interview 2005 Sept 7 16:10 hr tel +4686981620

Georgsson, Arne, 2005 Förpacknings- och Tidningsinsamlingen 2005 September 12 telephone interview 09:40 hr tel +46 8-566 144 02.

E-mail:

Ankers, Mikael, 2005b, Managing Director, REPA, mikael.ankers@repa.se e.mail, 2005 August 31 subject: SV: Greg Tyson Contact. Mail to Gregory.tyson@student.iiiee.lu.se

Göran, Nilsson, PressRetur, [goran.nilsson@sca.com] E-Mail,, 2005 July 20 Received by Gregory Tyson 2005 July 20 14:07 Subject: Info on collection entrepreneurs

Per, GlassÅtervinning [p.johansson@glasbanken.com] E-mail 2005 July 20 to Gregory Tyson Subject: Glass collection entrepreneurs

Göran, Björk, 2005 July 8 goran.bjork@scb.se E-mail to Gregory Tyson Subject: Information request

Quoden, Joachim, 2005 August 22 Joachim.Quoden@dsd-ag.de E-mail to Gregory Tyson Subject: Antw: Packaging collection in multi-family buildings

LEGISLATION

Swedish Environmental Code, Section 8, Section 11 http://www.regeringen.se/sb/d/108/a/1348 Accessed 15 June 2005

Regeringskansliet, 2005 http://www.sweden.gov.se/sb/d/2066/a/21609 Accessed 2005 June 22

Sveriges Riksdag Samhällsguiden, 2005 http://www.riksdagen.se/default____56.aspx Accessed 2005 May 20

Swedish Ministry of Finance, Local Government Act SFS 1991.900
http://www.sweden.gov.se/sb/d/574/a/29535 2005 Aug 16

REPA, 2005, English translation of Packaging Ordinance Accessed 2005 May 20
http://www.repa.se/global/docs/SFS%201997.185%20engelsk.pdf (FIND AN OFFICIAL SOURCE!)

Abbreviations & terms

FTi -Förpacknings- och Tidningsinsamlingen: (Packaging and Newspaper Collection): Joint not-for-profit 'partner company' owned by the material companies to coordinate dealings with municipalities and establish the Recycling Stations.

GlasÅtervinning: material company responsible for managing non-deposit-refund glass packaging

ICI – Institutional, Commercial and Industrial

Kommun: Swedish term for municipality.

Metallkretsen: material company responsible for managing metal packaging (except deposit-refund cans)

Narurvårdsverket: Swedish Environmental Protection Agency

Plastkretsen: material company responsible for managing plastic packaging

PressRetur: material company responsible for managing wastepaper (newsprint, magazines, direct advertising material, telephone directories, mail order catalogues etc.)

Producer: Defined under the Swedish Packaging Ordinance as any party in Sweden that professionally manufactures imports or sells packaging or a product contained in packaging

REPA Registriet AB: Not-for-profit administrative body collecting packaging fees from producers of plastic, metal and paper/cardboard packaging.

Returkartong: material company responsible for managing paper-based packaging and corrugated cardboard

Returpack: organisation managing the Swedish deposit-refund system for beverages sold in metal cans and plastic bottles

SEPA: Swedish Environmental Protection Agency

SMSD: Swedish Ministry of Sustainable Development

Wastepaper: Ordinance on Producer Responsibility for Wastepaper (1994:1205) definition as newsprint, magazines, direct advertising material, telephone directories, mail order catalogues.

Appendix A. Packaging and Wastepaper Primary Contractors by Municipality April, 2005

Summary:

	Plastkretsen	**Returkartong**	**Presssretur**	**Metallkretson**	**GlasÅtervinning**
Total number of collection entrepreneurs	39	5	16	63	123
# Municipalities with municipal org collecting	78	19	48	98	117
# Municipalities with private sector collecting	211	270	241	191	172
% Municipalities with municipal collectors	27.0%	6.6%	16.6%	33.9%	40.5%
# private sector collectors	7	2	8	14	29
# Municipal collectors	32	3	8	49	94
% Municipalities with private sector collectors	73.0%	93.4%	83.4%	66.1%	59.5%
Population served by municipal	2,801,803	1,024,743	2,238,648	3,336,628	3,837,777
% SE Population served by municipal organization	31.1%	11.4%	24.8%	37.0%	42.6%

Primary Collection Entrepreneurs:

Kommun	Plastkretsen [1]	Returkartong [2]	Presssretur[3]	Metallkretson [3]	GlasÅtervinning[4]
Blekinge län					
Karlshamn	Västblekinge Miljö AB	Stena Scanpaper AB	Stena Scanpaper AB	Västblekinge Miljö AB	Västblekinge Miljö AB
Karlskrona	Affärsverken Karlskrona AB	Stena Scanpaper AB	Stena Scanpaper AB	Affärsverken i Karlskrona AB	Affärsverken i Karlskrona AB
Olofström	Olofströms kommun	Stena Scanpaper AB	Stena Scanpaper AB	Västblekinge Miljö AB	Västblekinge Miljö AB
Ronneby	Ronneby Miljö & Teknik AB	Stena Scanpaper AB	Stena Scanpaper AB	Ronneby Miljö och Teknik AB	Ronneby Miljö och Teknik AB
Sölvesborg	Västblekinge Miljö AB	Stena Scanpaper AB	Stena Scanpaper AB	Västblekinge Miljö AB	Västblekinge Miljö AB
Dalarnas län					
Älvdalen	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Älvdalens kommun
Avesta	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Avesta kommun
Borlänge	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Ragn Sells AB	Ragn Sells AB
Falun	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Ragn-Sells AB
Gagnef	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Ragn Sells AB	Ragn Sells AB
Hedemora	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	SITA Sverige AB
Leksand	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	SITA Sverige AB
Ludvika	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Ludvika kommun	Ludvika kommun
Malung	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Malungs Kommun
Mora	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	SITA Sverige AB
Orsa	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	SITA Sverige AB
Rättvik	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	SITA Sverige AB
Säter	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	SITA Sverige AB
Smedjebacken	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Ragn Sells AB
Vansbro	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Mats Fagrell Åkeri AB
Gävleborgs län					
Bollnäs	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB
Gävle	Gästrike Återvinnare	Stena Scanpaper AB	Stena Scanpaper AB	Gästrike Återvinnare	Affärsverket Gävle Renhållare
Hofors	Gästrike Återvinnare	Stena Scanpaper AB	Stena Scanpaper AB	Gästrike Återvinnare	SITA Sverige AB
Hudiksvall	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB

Kommun	**Plastkretsen** [1]	**Returkartong** [2]	**Presssretur**[3]	**Metallkretson** [3]	**GlasÅtervinning**[4]
Ljusdal	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Ljusdals kommun
Nordanstig	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB
Ockelbo	Gästrike Återvinnare	Stena Scanpaper AB	Stena Scanpaper AB	Gästrike Återvinnare	SITA Sverige AB
Ovanåker	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB
Sandviken	Gästrike Återvinnare	Stena Scanpaper AB	Stena Scanpaper AB	Gästrike Återvinnare	SITA Sverige AB
Söderhamn	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Söderhamn Renhållning AB	Söderhamn Renhållning AB
Gotland					
Gotlands kommun	Gotlands kommun	Gotlands kommun	Stena Scanpaper AB	Gotlands kommun	Gotlands kommun
Hallands län					
Falkenberg	SITA Sverige AB	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB	FAVRAB
Halmstad	Halmstads Renhållnings AB	Stena Scanpaper AB	Stena Scanpaper AB	Halmstads Renhållnings AB	Halmstads Renhållnings AB
Hylte	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Återvinning & Miljö AB	SITA Sverige AB
Kungsbacka	LBC Borås AB	IL Recycling Service AB	Renova AB	Ragn-Sells AB	Kungsbacka kommun
Laholm	SITA Sverige AB	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB	SITA Sverige AB
Varberg	SITA Sverige AB	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB	Varbergs kommun
Jämtlands län					
Åre	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Jämtfrakt AB
Berg	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Jämtfrakt AB
Bräcke	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Jämtfrakt AB
Härjedalen	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Härjelast AB
Krokom	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Jämtfrakt AB
Östersund	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Jämtfrakt AB
Ragunda	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Jämtfrakt AB
Strömsund	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Jämtfrakt AB
Jönköpings län					
Aneby	Aneby Renhållning AB	Stena Scanpaper AB	SITA Sverige AB	Aneby Miljö och Vatten AB	Aneby Miljö och Vatten AB
Eksjö	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB	Ragn-Sells AB	Eksjö Energiverk AB

Kommun	**Plastkretsen** [1]	**Returkartong** [2]	**Presssretur**[3]	**Metallkretson** [3]	**GlasÅtervinning**[4]
Gislaved	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB	Återvinning & Miljö AB	SITA Sverige AB
Gnosjö	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB	Återvinning & Miljö AB	SITA Sverige AB
Habo	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB	Ragn-Sells AB	SITA Sverige AB
Jönköping	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB	SITA Sverige AB	Jönköpings kommun
Mullsjö	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB	Ragn-Sells AB	SITA Sverige AB
Nässjö	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB	SITA Sverige AB	SITA Sverige AB
Sävsjö	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB	Ragn-Sells AB	Sävsjö kommun
Tranås	Östgötafrakt AB	Stena Scanpaper AB	SITA Sverige AB	SITA Sverige AB	SITA Sverige AB
Vaggeryd	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB	Återvinning & Miljö AB	SITA Sverige AB
Värnamo	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB	SITA Sverige AB	Wennbergs Åkeri AB
Vetlanda	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB	Ragn-Sells AB	Vetlanda kommun
Kalmar län					
Borgholm	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Samfrakt i Sydost AB	Borgholms kommun
Emmaboda	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Emmaboda Energi	Samfrakt i Sydost AB
Högsby	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Samfrakt i Sydost AB	Högsby LBC
Hultsfred	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	LBC Vimmerby-Hultsfred
Kalmar	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Kalmar Vatten och Renhållning AB	Kalmar Vatten och Renhållning AB
Mönsterås	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Samfrakt i Sydost AB	LBC Mönsterås
Mörbylånga	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Samfrakt i Sydost AB	Mörbylånga kommun
Nybro	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Samfrakt i Sydost AB	Nybro kommun
Oskarshamn	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Oskarshamns kommun	Oskarshamns kommun
Torsås	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Samfrakt i Sydost AB	Torsås kommun
Västervik	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Västerviks kommun	Västerviks kommun
Vimmerby	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Vimmerby kommun
Kronobergs län					
Älmhult	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB	Älmhults kommun

Kommun	**Plastkretsen** [1]	**Returkartong** [2]	**Presssretur**[3]	**Metallkretson** [3]	**GlasÅtervinning**[4]
Alvesta	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB	Alvesta Renhållnings AB
Lessebo	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Samfrakt i Sydost AB	Lessebo ÅC
Ljungby	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB	Ljungby kommun
Markaryd	Stena Scanpaper AB	Stena Scanpaper AB	LBC Södra Sunnerbo	SITA Sverige AB	Markaryds kommun, Renhållningen
Tingsryd	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Samfrakt i Sydost AB	Lessebo ÅC
Uppvidinge	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Samfrakt i Sydost AB	Uppvidinge kommun
Växjö	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Alwex Transport AB
Norrbottens län					
Älvsbyn	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Miljö och Teknik i Kangos AB	Ragn-Sells Norr AB
Arjeplog	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Miljö och Teknik i Kangos AB	Ragn-Sells Norr AB
Arvidsjaur	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Miljö och Teknik i Kangos AB	Ragn-Sells Norr AB
Boden	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Luleå Kommunala Renhållning AB	Bodens kommun
Gällivare	Miljö & Teknik i Kangos AB	IL Recycling Service AB	IL Recycling Service AB	Miljö och Teknik i Kangos AB	Ragn-Sells Norr AB
Haparanda	Miljö & Teknik i Kangos AB	IL Recycling Service AB	IL Recycling Service AB	Miljö och Teknik i Kangos AB	Ragn-Sells Norr AB
Jokkmokk	Miljö & Teknik i Kangos AB	IL Recycling Service AB	IL Recycling Service AB	Miljö och Teknik i Kangos AB	Ragn-Sells Norr AB
Kalix	Miljö & Teknik i Kangos AB	IL Recycling Service AB	IL Recycling Service AB	Miljö och Teknik i Kangos AB	Ragn-Sells Norr AB
Kiruna	Miljö & Teknik i Kangos AB	IL Recycling Service AB	IL Recycling Service AB	Miljö och Teknik i Kangos AB	Ragn-Sells Norr AB
Luleå	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Luleå Kommunala Renhållning AB	Luleå Kommunala Renhållning AB
Överkalix	Miljö & Teknik i Kangos AB	IL Recycling Service AB	IL Recycling Service AB	Miljö och Teknik i Kangos AB	Överkalix kommun
Övertorneå	Miljö & Teknik i Kangos AB	IL Recycling Service AB	IL Recycling Service AB	Miljö och Teknik i Kangos AB	Ragn-Sells Norr AB
Pajala	Miljö & Teknik i Kangos AB	IL Recycling Service AB	IL Recycling Service AB	Miljö och Teknik i Kangos AB	Ragn-Sells Norr AB
Piteå	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Piteå Renhållning	Ragn-Sells Norr AB
Örebro län					
Askersund	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells AB	LBC Askersund
Degerfors	Karlskoga Energi & Miljö AB	IL Recycling Service AB	IL Recycling Service AB	Karlskoga Miljö AB	LBC Askersund
Hällefors	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells AB	LBC Askersund

Kommun	**Plastkretsen** [1]	**Returkartong** [2]	**Presssretur**[3]	**Metallkretson** [3]	**GlasÅtervinning**[4]
Hallsberg	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells AB	LBC Askersund
Karlskoga	Karlskoga Energi & Miljö AB	IL Recycling Service AB	IL Recycling Service AB	Karlskoga Miljö AB	Karlskoga Miljö AB
Kumla	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells AB	LBC Askersund
Laxå	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells AB	LBC Askersund
Lekeberg	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells AB	LBC Askersund
Lindesberg	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells AB	LBC Askersund
Ljusnarsberg	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells AB	LBC Askersund
Nora	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells AB	LBC Askersund
Örebro	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells AB	LBC Askersund
Östergötlands län					
Åtvidaberg	Östgötafrakt AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	SITA Sverige AB
Boxholm	Östgötafrakt AB	IL Recycling Service AB	IL Recycling Service AB	SITA Sverige AB	Boxholms kommun
Finspång	Östgötafrakt AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	LBC Finspång
Kinda	Östgötafrakt AB	IL Recycling Service AB	IL Recycling Service AB	SITA Sverige AB	SITA Sverige AB
Linköping	Östgötafrakt AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	SITA Sverige AB
Mjölby	Östgötafrakt AB	IL Recycling Service AB	IL Recycling Service AB	Mjölby kommun	Mjölby kommun
Motala	Östgötafrakt AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	SITA Sverige AB
Norrköping	Östgötafrakt AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	SITA Sverige AB
Ödeshög	Östgötafrakt AB	IL Recycling Service AB	IL Recycling Service AB	SITA Sverige AB	Ödeshögs kommun
Söderköping	Östgötafrakt AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	SITA Sverige AB
Vadstena	Östgötafrakt AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	SITA Sverige AB
Valdemarsvik	Östgötafrakt AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	SITA Sverige AB
Ydre	Östgötafrakt AB	IL Recycling Service AB	IL Recycling Service AB	Aneby Renhållning AB	Ydre Åkeri
Skåne län					
Ängelholm	Nordvästra Skånes Renhållnings AB	IL Recycling Service AB	LSR/Ohlson	NSR, Nordvästra Skånes Renhållning AB	NSR, Nordvästra Skånes Renhållning AB

Kommun	**Plastkretsen** [1]	**Returkartong** [2]	**Presssretur**[3]	**Metallkretson** [3]	**GlasÅtervinning**[4]
Åstorp	Nordvästra Skånes Renhållnings AB	IL Recycling Service AB	LSR/Ohlson	NSR, Nordvästra Skånes Renhållning AB	NSR, Nordvästra Skånes Renhållning AB
Båstad	Nordvästra Skånes Renhållnings AB	IL Recycling Service AB	OHLSSONS AB	NSR, Nordvästra Skånes Renhållning AB	NSR, Nordvästra Skånes Renhållning AB
Bjuv	Nordvästra Skånes Renhållnings AB	IL Recycling Service AB	OHLSSONS AB	NSR, Nordvästra Skånes Renhållning AB	NSR, Nordvästra Skånes Renhållning AB
Bromölla	Västblekinge Miljö AB	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Västblekinge Miljö AB
Burlöv	SITA Sverige AB	Sydåtervinning	Sydåtervinning	IL Recycling Service AB	Ekdahls åkeri AB
Eslöv	Mellanskånes Renhållningsaktiebolag	Stena Scanpaper AB	Stena Scanpaper AB	MERAB	MERAB
Hässleholm	SITA Sverige AB	Stena Scanpaper AB	Stena Scanpaper AB	Hässleholms Renhållare AB	Hässleholms Renhållare AB
Helsingborg	Nordvästra Skånes Renhållnings AB	IL Recycling Service AB	OHLSSONS AB	NSR, Nordvästra Skånes Renhållning AB	NSR, Nordvästra Skånes Renhållning AB
Höganäs	Nordvästra Skånes Renhållnings AB	IL Recycling Service AB	OHLSSONS AB	NSR, Nordvästra Skånes Renhållning AB	NSR, Nordvästra Skånes Renhållning AB
Höör	Mellanskånes Renhållningsaktiebolag	Stena Scanpaper AB	Stena Scanpaper AB	MERAB	MERAB
Hörby	Mellanskånes Renhållningsaktiebolag	Stena Scanpaper AB	Stena Scanpaper AB	MERAB	MERAB
Kävlinge	SITA Sverige AB	Sydåtervinning	Sydåtervinning	IL Recycling Service AB	Kävlinge kommun
Klippan	Nordvästra Skånes Renhållnings AB	IL Recycling Service AB	LSR/Ohlson	Norra Åsbo Renhållning AB	Norra Åsbo Renhållning AB
Kristianstad	Kristianstads Renhållnings AB	Stena Scanpaper AB	Stena Scanpaper AB	Kristianstads Renhållnings AB	Kristianstads Renhållnings AB
Landskrona	SITA Sverige AB	IL Recycling Service AB	LSR/Ohlson	LSR AB	LSR AB
Lomma	SITA Sverige AB	Sydåtervinning	Sydåtervinning	IL Recycling Service AB	Lomma kommun
Lund	Lunds Renhållningsverk	Sydåtervinning	Sydåtervinning	Lunds Renhållningsverk	Lunds Kommun
Malmö	SITA Sverige AB	Sydåtervinning	Sydåtervinning	IL Recycling Service AB	Ekdahls åkeri AB
Örkelljunga	Nordvästra Skånes Renhållnings AB	IL Recycling Service AB	LSR/Ohlson	Norra Åsbo Renhållning AB	Norra Åsbo Renhållning AB
Osby	SITA Sverige AB	Stena Scanpaper AB	Stena Scanpaper AB	Östra Göinge Renhållning AB	Östra Göinge Renhållning AB
Östra Göinge	SITA Sverige AB	Stena Scanpaper AB	SITA Sverige AB	Östra Göinge Renhållning AB	Östra Göinge Renhållning AB
Perstorp	Nordvästra Skånes Renhållnings AB	IL Recycling Service AB	LSR/Ohlson	Norra Åsbo Renhållning AB	Norra Åsbo Renhållning AB

Kommun	**Plastkretsen** [1]	**Returkartong** [2]	**Presssretur**[3]	**Metallkretson** [3]	**GlasÅtervinning**[4]
Simrishamn	SITA Sverige AB	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB	ÖKRAB
Sjöbo	SITA Sverige AB	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB	Ekdahls åkeri AB
Skurup	SITA Sverige AB	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB	Ekdahls åkeri AB
Staffanstorp	SITA Sverige AB	Sydåtervinning	Sydåtervinning	IL Recycling Service AB	Ekdahls åkeri AB
Svalöv	SITA Sverige AB	IL Recycling Service AB	LSR AB	LSR AB	LSR AB
Svedala	SITA Sverige AB	Sydåtervinning	Sydåtervinning	IL Recycling Service AB	Ekdahls åkeri AB
Tomelilla	SITA Sverige AB	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB	ÖKRAB
Trelleborg	SITA Sverige AB	Sydåtervinning	Sydåtervinning	IL Recycling Service AB	Ekdahls åkeri AB
Vellinge	SITA Sverige AB	Sydåtervinning	Sydåtervinning	IL Recycling Service AB	Ekdahls åkeri AB
Ystad	SITA Sverige AB	Stena Scanpaper AB	Stena Scanpaper AB	SITA Sverige AB	Ekdahls åkeri AB
Södermanlands län					
Eskilstuna	SITA Sverige AB	IL Recycling Service AB	IL Recycling Service AB	Eskilstuna Energi & Miljö	SITA Sverige AB
Flen	SITA Sverige AB	IL Recycling Service AB	IL Recycling Service AB	Katrineholms Miljö och Återvinning AB	SITA Sverige AB
Gnesta	SITA Sverige AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	SITA Sverige AB
Katrineholm	SITA Sverige AB	IL Recycling Service AB	IL Recycling Service AB	Katrineholms Miljö och Återvinning AB	SITA Sverige AB
Nyköping	SITA Sverige AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	SITA Sverige AB
Oxelösund	SITA Sverige AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	SITA Sverige AB
Strängnäs	SITA Sverige AB	IL Recycling Service AB	IL Recycling Service AB	Strängnäs kommun	Strängnäs kommun
Trosa	SITA Sverige AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	SITA Sverige AB
Vingåker	SITA Sverige AB	IL Recycling Service AB	IL Recycling Service AB	Katrineholms Miljö och Återvinning AB	SITA Sverige AB
Stockholms län					
Botkyrka	SRV Återvinning AB	SRV Återvinning AB	SRV Återvinning AB	SRV Återvinning AB	SRV Återvinning AB
Danderyd	SITA Sverige AB	IL Recycling Service AB	IL Recycling Service AB	SITA Sverige AB	Wiklunds Åkeri AB
Ekerö	IL Recycling Service AB	SRV Återvinning AB	SITA Sverige AB	Ragn-Sells AB	SITA Sverige AB
Haninge	SRV Återvinning AB	SRV Återvinning AB	SRV Återvinning AB	SRV Återvinning AB	SRV Återvinning AB

Kommun	**Plastkretsen** [1]	**Returkartong** [2]	**Presssretur**[3]	**Metallkretson** [3]	**GlasÅtervinning**[4]
Huddinge	SRV Återvinning AB	SRV Återvinning AB	SRV Återvinning AB	SRV Återvinning AB	SRV Återvinning AB
Järfälla	SITA Sverige AB	IL Recycling Service AB	IL Recycling Service AB	SITA Sverige AB	Wiklunds Åkeri AB
Lidingö	SITA Sverige AB	IL Recycling Service AB	SITA Sverige AB	SITA Sverige AB	Wiklunds Åkeri AB
Nacka	SITA Sverige AB	IL Recycling Service AB	SITA Sverige AB	SITA Sverige AB	SITA Sverige AB
Norrtälje	IL Recycling Service AB	IL Recycling Service AB	Norrtälje Kommun	Ragn-Sells AB	SITA Sverige AB
Nykvarn	Telge Återvinning AB	SRV Återvinning AB	SRV Återvinning AB	Telge Återvinning AB	Telge Återvinning AB
Nynäshamn	SRV Återvinning AB	SRV Återvinning AB	SRV Återvinning AB	SRV Återvinning AB	SRV Återvinning AB
Österåker	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells AB	SITA Sverige AB
Salem	SRV Återvinning AB	SRV Återvinning AB	SRV Återvinning AB	SRV Återvinning AB	SRV Återvinning AB
Sigtuna	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells AB	SITA Sverige AB
Södertälje	Telge Återvinning AB	SRV Återvinning AB	SRV Återvinning AB	Telge Återvinning AB	Telge Återvinning AB
Sollentuna	SITA Sverige AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells AB	Wiklunds Åkeri AB
Solna	SITA Sverige AB	IL Recycling Service AB	SITA Sverige AB	SITA Sverige AB	Wiklunds Åkeri AB
Stockholm	SITA Sverige AB	IL Recycling Service AB	SITA Sverige AB	SITA Sverige AB	SITA Sverige AB
Sundbyberg	SITA Sverige AB	IL Recycling Service AB	SITA Sverige AB	SITA Sverige AB	Wiklunds Åkeri AB
Täby	SITA Sverige AB	IL Recycling Service AB	IL Recycling Service AB	SITA Sverige AB	Wiklunds Åkeri AB
Tyresö	SITA Sverige AB	SRV Återvinning AB	SRV Återvinning AB	SITA Sverige AB	SITA Sverige AB
Upplands-Bro	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells AB	SITA Sverige AB
Upplands-Väsby	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells AB	Wiklunds Åkeri AB
Vallentuna	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells AB	Wiklunds Åkeri AB
Värmdö	SITA Sverige AB	IL Recycling Service AB	Resta	SITA Sverige AB	SITA Sverige AB
Vaxholm	IL Recycling Service AB	IL Recycling Service AB	SITA Sverige AB	Ragne-Sells AB	SITA Sverige AB
Uppsala län					
Älvkarleby	Gästrike Återvinnare	Stena Scanpaper AB	Stena Scanpaper AB	Gästrike Återvinnare	SITA Sverige AB
Enköping	Västmanlands AvfallsAB VAFAB	Stena Scanpaper AB	Vafab	Ragn-Sells AB	SITA Sverige AB
Håbo	IL Recycling Service AB	Stena Scanpaper AB	Vafab	Ragn-Sells AB	SITA Sverige AB
Knivsta	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	

Kommun	**Plastkretsen** [1]	**Returkartong** [2]	**Presssretur**[3]	**Metallkretson** [3]	**GlasÅtervinning**[4]
Östhammar	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	B-O Johansson Entreprenad &Transport AB
Tierp	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Tierps kommun
Uppsala	Stena Scanpaper AB	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Uppsala Gatukontor
Värmlands län					
Årjäng	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Ragn-Sells AB	Årjängs kommun
Arvika	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Ragn-Sells AB	Arvika kommun
Eda	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Ragn-Sells AB	LBC Charlottenberg
Filipstad	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Ragn-Sells AB	SITA Sverige AB
Forshaga	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Ragn-Sells AB	SITA Sverige AB
Grums	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Ragn-Sells AB	SITA Sverige AB
Hagfors	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Ragn-Sells AB	Hagfors kommun
Hammarö	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Ragn-Sells AB	SITA Sverige AB
Karlstad	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Ragn-Sells AB	SITA Sverige AB Karlstad
Kil	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Ragn-Sells AB	SITA Sverige AB
Kristinehamn	Kristinehamns kommun, Tekniska förvaltningen	Stena Scanpaper AB	Ragn-Sells AB	Kristinehamns kommun	Kristinehamns kommun
Munkfors	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Ragn-Sells AB	Munkfors kommun
Säffle	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Ragn-Sells AB	AB L. Larsson Grävmaskiner
Storfors	Karlskoga Energi & Miljö AB	Stena Scanpaper AB	Ragn-Sells AB	Karlskoga Miljö AB	Storfors kommun
Sunne	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Ragn-Sells AB	SITA Sverige AB
Torsby	Stena Scanpaper AB	Stena Scanpaper AB	Ragn-Sells AB	Ragn-Sells AB	Torsby Lastbilscentral
Västerbottens län					
Åsele	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Jämtfrakt AB
Bjurholm	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells Norr AB
Dorotea	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Jämtfrakt AB
Lycksele	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Lycksele kommun
Malå	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells Norr AB

Kommun	**Plastkretsen** [1]	**Returkartong** [2]	**Presssretur**[3]	**Metallkretson** [3]	**GlasÅtervinning**[4]
Nordmaling	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells Norr AB
Norsjö	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Norsjö kommun
Robertsfors	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells Norr AB
Skellefteå	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells Norr AB
Sorsele	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Jämtfrakt AB
Storuman	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Jämtfrakt AB
Umeå	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells Norr AB
Vännäs	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells Norr AB
Vilhelmina	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Jämtfrakt AB
Vindeln	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Ragn-Sells Norr AB
Västernorrlands län					
Ånge	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Sundfrakt AB
Härnösand	Härnösands Energi & Miljö AB	IL Recycling Service AB	IL Recycling Service AB	Härnösand Energi och Miljö AB	Härnösand Energi och Miljö AB
Kramfors	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	SITA Sverige AB
Örnsköldsvik	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	SITA Sverige AB
Sollefteå	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Sollefteå Energi AB
Sundsvall	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	IL Recycling Service AB	Sundfrakt AB
Timrå	Timrå Renhållnings AB	IL Recycling Service AB	IL Recycling Service AB	TIRAB	TIRAB
Arboga	Västra Mälardalens Renh AB VMR	IL Recycling Service AB	Vafab	Ragn-Sells AB	Västra Mälardalens Renhållning
Fagersta	Västmanlands AvfallsAB VAFAB	IL Recycling Service AB	Vafab	Ragn-Sells AB	SITA Sverige AB
Hallstahammar	Västmanlands AvfallsAB VAFAB	IL Recycling Service AB	Vafab	Ragn-Sells AB	SITA Sverige AB
Heby	Västmanlands AvfallsAB VAFAB	IL Recycling Service AB	Returpappercentralen i Uppsala	Ragn-Sells AB	SITA Sverige
Köping	Västra Mälardalens Renh AB VMR	IL Recycling Service AB	Vafab	Ragn-Sells AB	Västra Mälardalens Renhållning
Kungsör	Västra Mälardalens Renh AB VMR	IL Recycling Service AB	Vafab	Ragn-Sells AB	Västra Mälardalens Renhållning

Kommun	**Plastkretsen** [1]	**Returkartong** [2]	**Presssretur**[3]	**Metallkretson** [3]	**GlasÅtervinning**[4]
Norberg	Västmanlands AvfallsAB VAFAB	IL Recycling Service AB	Vafab	Ragn-Sells AB	SITA Sverige AB
Sala	Sala kommun, Samhällsbyggnadsförvaltning	IL Recycling Service AB	Vafab	Sala kommun	Sala kommun
Skinnskatteberg	Västmanlands AvfallsAB VAFAB	IL Recycling Service AB	Vafab	Ragn-Sells AB	SITA Sverige AB
Surahammar	Västmanlands AvfallsAB VAFAB	IL Recycling Service AB	Vafab	Ragn-Sells AB	SITA Sverige AB
Västerås	Västmanlands AvfallsAB VAFAB	IL Recycling Service AB	Vafab	Ragn-Sells AB	SITA Sverige AB
Västra Götalands län					
Ale	Ale kommun	IL Recycling Service AB	Renova AB	Ale kommun	Ale kommun
Alingsås	LBC Borås AB	Stena Scanpaper AB	H.A. Industri Göteborg AB	Borås kommun, Gatukontoret	SITA Sverige AB
Åmål	Stena Scanpaper AB	Stena Scanpaper AB	H.A. Industri Göteborg AB	Ragn-Sells AB	AB L. Larsson Grävmaskiner
Bengtsfors	Stena Scanpaper AB	Stena Scanpaper AB	H.A. Industri Göteborg AB	Ragn-Sells AB	AB L. Larsson Grävmaskiner, Ellös
Bollebygd	LBC Borås AB	Stena Scanpaper AB	H.A. Industri Göteborg AB	Borås kommun, Gatukontoret	Återvinning & Miljö AB
Borås	Borås kommun, Gatukontoret	Stena Scanpaper AB	H.A. Industri Göteborg AB	Borås kommun, Gatukontoret	Borås kommun, Gatukontoret
Dals-Ed	Stena Scanpaper AB	Stena Scanpaper AB	H.A. Industri Göteborg AB	Ragn-Sells AB	AB L. Larsson Grävmaskiner
Essunga	SITA Sverige AB	Stena Scanpaper AB	SITA Sverige AB	Ragn-Sells AB	SITA Sverige AB
Falköping	SITA Sverige AB	Stena Scanpaper AB	SITA Sverige AB	SITA Sverige AB	Falköpings kommun
Färgelanda	Stena Scanpaper AB	Stena Scanpaper AB	H.A. Industri Göteborg AB	Ragn-Sells AB	AB L. Larsson Grävmaskiner
Göteborg	Renova AB	IL Recycling Service AB	Renova AB	Renova AB	Renova AB
Götene	SITA Sverige AB	Stena Scanpaper AB	SITA Sverige AB	Ragn-Sells AB	Ragn-Sells AB
Grästorp	SITA Sverige AB	Stena Scanpaper AB	SITA Sverige AB	Ragn-Sells AB	Grästorps kommun
Gullspång	SITA Sverige AB	Stena Scanpaper AB	SITA Sverige AB	Ragn-Sells AB	LBC Askersund
Härryda	Renova AB	IL Recycling Service AB	Renova AB	Renova AB	Renova AB
Herrljunga	LBC Borås AB	Stena Scanpaper AB	H.A. Industri Göteborg AB	Borås kommun, Gatukontoret	SITA Sverige AB Skara
Hjo	SITA Sverige AB	Stena Scanpaper AB	SITA Sverige AB	Ragn-Sells AB	Avfallshantering Östra Skaraborg
Karlsborg	SITA Sverige AB	Stena Scanpaper AB	SITA Sverige AB	Ragn-Sells AB	Karlsborgs kommun
Kungälv	Kungälvs Transporttjänst AB	IL Recycling Service AB	Renova AB	Kungälvs Transporttjänst AB	Kungälvs Transporttjänst AB

Kommun	**Plastkretsen** [1]	**Returkartong** [2]	**Presssretur**[3]	**Metallkretson** [3]	**GlasÅtervinning**[4]
Lerum	Återvinning & Miljö AB	IL Recycling Service AB	IL Recycling Service AB	Återvinning & Miljö AB	SITA Sverige AB
Lidköping	SITA Sverige AB	Stena Scanpaper AB	SITA Sverige AB	SITA Sverige AB	Lidköpings kommun
Lilla Edet	Stenungsunds Renhållning AB	IL Recycling Service AB	HA Industrier	Stenungsunds Renhållning AB	Stenungsunds Renhållning AB
Lysekil	RAMBO	Stena Scanpaper AB	HA Industrier	RAMBO	RAMBO
Mariestad	SITA Sverige AB	Stena Scanpaper AB	SITA Sverige AB	Ragn-Sells AB	SITA Sverige AB
Mark	LBC Borås AB	Stena Scanpaper AB	HA Industrier	Borås kommun, Gatukontoret	Återvinning & Miljö AB
Mellerud	Stena Scanpaper AB	Stena Scanpaper AB	HA Industrier	Ragn-Sells AB	AB L. Larsson Grävmaskiner, Ellös
Mölndal	Mölndals kommun, Renhållningsav	IL Recycling Service AB	Renova AB	Mölndals kommun	Mölndals kommun
Munkedal	RAMBO	Stena Scanpaper AB	HA Industrier	RAMBO	AB L. Larsson Grävmaskiner, Ellös
Öckerö	Öckerö kommun	IL Recycling Service AB	Renova AB	Öckerö Kommun	AB L. Larsson Grävmaskiner
Orust	Återvinning & Miljö AB	IL Recycling Service AB	HA Industrier	Återvinning & Miljö AB	AB L. Larsson Grävmaskiner, Ellös
Partille	Renova AB	IL Recycling Service AB	Renova AB	Renova AB	Partille kommun
Skara	SITA Sverige AB	Stena Scanpaper AB	SITA Sverige AB	SITA Sverige AB	SITA Sverige AB
Skövde	SITA Sverige AB	Stena Scanpaper AB	SITA Sverige AB	SITA Sverige AB	SITA Sverige AB
Sotenäs	RAMBO	Stena Scanpaper AB	HA Industrier	RAMBO AB	RAMBO AB
Stenungsund	Stenungsunds Renhållning AB	IL Recycling Service AB	Renova AB	Stenungsunds Renhållning AB	Stenungsunds Renhållning AB
Strömstad	RAMBO	Stena Scanpaper AB	HA Industrier	RAMBO	Strömstads kommun
Svenljunga	LBC Borås AB	Stena Scanpaper AB	HA Industrier	Borås kommun, Gatukontoret	Svenljunga kommun
Tanum	RAMBO	Stena Scanpaper AB	HA Industrier	RAMBO	AB L. Larsson Grävmaskiner
Tibro	SITA Sverige AB	Stena Scanpaper AB	SITA Sverige AB	Ragn-Sells AB	MiljöVille AB
Tidaholm	SITA Sverige AB	Stena Scanpaper AB	SITA Sverige AB	Ragn-Sells AB	Tidaholms kommun
Tjörn	Återvinning & Miljö AB	IL Recycling Service AB	Renova AB	Återvinning & Miljö AB	Tjörns kommun
Töreboda	SITA Sverige AB	Stena Scanpaper AB	SITA Sverige AB	Ragn-Sells AB	SITA Sverige AB
Tranemo	LBC Borås AB	Stena Scanpaper AB	HA Industrier	Borås kommun	SITA Sverige AB
Trollhättan	Trollhättans kommun, Tekniska förvatlningen	Stena Scanpaper AB	HA Industrier	Trollhättans kommun	Trollhättans kommun

Kommun	**Plastkretsen** [1]	**Returkartong** [2]	**Presssretur**[3]	**Metallkretson** [3]	**GlasÅtervinning**[4]
Uddevalla	Uddevalla kommun, Renhållningsavdelningen	Stena Scanpaper AB	HA Industrier	Uddevalla kommun	Uddevalla kommun
Ulricehamn	LBC Borås AB	Stena Scanpaper AB	HA Industrier	Borås kommun	Återvinning & Miljö AB
Vänersborg	Vänersborgs kommun, Gatuenheten, Renhållningsverket	Stena Scanpaper AB	HA Industrier	Vänersborgs kommun	Vänersborgs kommun
Vara	SITA Sverige AB	Stena Scanpaper AB	SITA Sverige AB	Ragn-Sells AB	SITA Sverige AB
Vårgårda	LBC Borås AB	Stena Scanpaper AB	HA Industrier	Borås kommun, Gatukontoret	SITA Sverige AB

Notes:

1. Plastkretsen, Collection Entrepreneurs http://www.plastkretsen.se
2. Returkartong Collection Entrepreneurs, Effective to 1 April 2006 http://www.returkartong.se/
3. MetallKretsen, Collection Entrepreneurs http://www.metallkretsen.se/
4. GlasÅtervinning, Collection Entrepreneurs, e-mail, 2005 July 8 to Gregory Tyson Per Johansson Re: Glass collection entrepreneurs