PART II

Chapter 3

Governance issues and extended producer responsibility

This chapter begins with a discussion of why government is involved in EPR systems[1] *that, on first glance, are intended to lessen the role of the public sector in end-of-life management. Four typical governance structures are then presented and their advantages and disadvantages discussed. The role and status of producer responsibility organizations (PROs) are characterized and the debate over non-profit versus for-profit status for PROs is discussed. From there, the chapter looks at governance functions in EPR and their allocation among different stakeholders, as well as the resources needed for government participation in EPR systems.*

3.1. Introduction

The concept of "extended producer responsibility" (EPR) has become an established principle of environmental policy in many countries since the term was first introduced in the early 1990s (Lindhqvist 2000). It is an environmental policy strategy in which the responsibility of producers for their products is extended to include the costs and sometimes the management of end-of-life products, especially the recycling of their products.[2] The concept of EPR includes a wide range of instruments, from eco-design measures to information programs to financial contributions towards separate collection and recycling. Some of these systems are put in place by industry on a voluntary basis, while others are based on legislative obligations requiring companies to pay fees to support the costs of organising the (separate) collection, sorting, and recycling of specific waste streams to meet sub-national (state or provincial),[3] national, or supra-national (European) targets.

Many OECD countries have EPR policies in place for packaging, electronics, batteries, tires, or end-of-life vehicles, and have accumulated experience on the design and implementation of the resulting systems. At the same time, an increasing number of developing countries are either considering or have already undertaken steps to introduce EPR into their materials management policy frameworks and these are often an integral part of policies to achieve a circular economy, improve materials security, and increase competitiveness.

The OECD carried out a significant body of research on extended producer responsibility systems in the 1990s and early 2000, including publication of *Guidance Manual for Governments* in 2001 (OECD, 2001). This manual defines EPR as having two separate objectives: i) to shift responsibility upstream to the producer and away from municipalities and ii) to incentivise producers to incorporate environmental considerations in the design of their products. Since then, a significant body of experience of the real-world use of these policies has been built up. In general, while EPR has been successful at shifting responsibility and cost burdens to producers, effects on product design have been harder to identify.

Recent discussions have highlighted diverse experience and opinions on the levels of government involvement in the administration of EPR. Based on these experiences and on feedback provided by governments at the *Global Forum on Environment: Promoting Sustainable Materials Management through Extended Producer Responsibility (EPR) (*Tokyo, June 2014), selected governance-related topics are addressed in this report. Unfortunately, systematic or critical analysis and even information on many governance approaches and functions is lacking in both academic and policy research. While there are many attempts to assess the policy design of EPR systems (policy goals, performance targets, fees, operational roles) and policy outcomes (recycling rates, cost-efficiency), little has been written about how the nitty-gritty of governance and administration is conducted or how well various approaches work.[4] This report is thus an initial foray to clarify issues, identify lessons learned, and determine where further research is needed.

This chapter begins with a discussion of why government is involved in EPR systems[5] that, on first glance, are intended to lessen the role of the public sector in end-of-life

management, examining the role of market failure as it relates to voluntary and mandatory approaches to EPR, to markets where some end-of-life products have value, and to EPR in developing countries. Four typical governance structures are then presented. The role and status of producer responsibility organizations (PROs) are characterized and the debate over non-profit versus for-profit status for PROs is discussed. From there, the chapter looks at governance functions in EPR including policy formulation and evaluation; operations; stakeholder consultation; registration and accreditation; collection and disbursement of fees; co-ordination through clearinghouses; monitoring; and enforcement. The allocation of governance functions and advantages and disadvantages of alternative governance structures are discussed, with particular attention to the role of municipalities. Resources needed for government participation in EPR systems are described including the role of outsourcing and delegation of governance functions to non-governmental entities. The chapter concludes with observations about patterns and best practices in EPR governance.

3.1.1. Why is government involved in EPR systems?

A key premise in EPR is a shift of responsibilities for waste management from the public sector to the private sector, raising the question of why – or how much – government is involved in such systems. In most countries, government is involved in waste management as a regulator and as a service provider. Typically, national or regional sub-national (state or provincial) governments act as regulators, whereas it is local governments that are assigned operational responsibility for waste management. In some cases, those local governments provide services themselves using government employees. In others, the local government contracts out those services to commercial providers. In still others, individual waste generators contract directly with collection services (with varying degrees of oversight by local governments). Thus, EPR represents not so much an entirely new intervention of government in the market for waste management as a different form of intervention.

This new role of government involves a different characterisation of the problems posed by waste and a reassignment of responsibilities entailing involvement of additional stakeholders. The result is that new forms of governance of waste management have emerged. Governance in this context[6] refers to the organisation and administration of matters related to waste generation, management and policy by decision-makers at all levels including governments, businesses, advocacy organisations and other elements of civil society, members of the informal economy, and consumers/waste generators. Government is one element in the system of governance, albeit a pivotal one.

EPR represents, at least conceptually, a potential reduction of government involvement in waste management and yet even a cursory examination of EPR as it is practiced around the world indicates that governments are involved. The nature and extent of government involvement in EPR systems reflects the need to respond to market failures and, as EPR systems evolve, to problems that emerge with policies and program that are in place. Government involvement also exists because of the familiar requirement for monitoring and enforcement of public policy. Put more simply, government is involved because EPR systems require not only sound policy design, but also effective governance to operate effectively.

3.1.2. Voluntary approaches to EPR

Voluntary approaches to producer responsibility for end-of-life management of products exist in a variety of markets, adding a further dimension to the discussion of market failure and EPR governance. Voluntary product take-back – the most salient form of voluntary

EPR – is most commonly found in markets for durable commercial products and/or where end-of-life products have value (positive prices), often under the rubric of "asset recovery". Photocopiers are a long-cited example (Murray and Vietor, 1993; Reinhardt, 2000). Voluntary take-back may also be pursued by a producer seeking to prevent acquisition, refurbishment, and resale of its own products by third-parties (Ferguson and Toktay, 2006). Concern over loss of market share to refurbishers is thought to spur take-back by producers of toner cartridges and lenses from single use cameras. Reputational advantages and pre-emption of mandatory obligations can also motivate firms to engage in product take-back (Toffel, 2004; Nash and Bosso, 2013; Agrawal et al., 2015).

Voluntary approaches have been advocated by regulated and potentially regulated industries as a superior approach to the mandatory approaches discussed in this chapter, in part, because of their potential for flexibility and lower cost (Galeano, 1996; Renckens, 2008). While little systematic quantitative information is available on the proportion of end-of-life products managed through voluntary EPR, it appears confined to a few, specific products or product categories. That is, market forces will lead firms to take back products where it is profitable to do so. The question then becomes one of whether the amount of product take-back that occurs as a result of market forces is sufficient for policy purposes. Do products with lower end-of-life value, hazardous substances, or which are costly to collect and process also need to be the responsibility of producers? In the latter case, the issue is whether producers will adopt ongoing "beyond compliance" practices through a voluntary commitment to the extent deemed necessary by policy makers. Stated another way, will corporate social responsibility provide the level of continuing end-of-life management that is sought or is mandatory EPR required?[7]

Voluntary approaches to EPR can be hindered by the failure to progress beyond business as usual, regulatory capture, poor monitoring, free riding, and transaction costs (Barde, 2004). Analysis of voluntary and mandatory approaches suggests that voluntary approaches do not have the scope and transparency that can achieve ambitious policy targets (Quinn and Sinclair, 2006). That is, voluntary approaches not only face challenges in terms of performance, but also with respect to governance – data availability, measurement, and transparency in particular. The potential effectiveness of voluntary EPR is likely to be a function of the characteristics of the relevant product, the market conditions in the associated industry sectors, and the extent of transparency and oversight in the voluntary programs.

Governance of voluntary environmental initiatives has been studied (King and Lenox, 2000; Potoski and Prakash, 2013), but no research has been found on governance of voluntary EPR specifically. More broadly, voluntary approaches to environmental policy in general have been widely criticised in the research literature as ineffective (Harrison, 1998; OECD, 2003; Morgenstern and Pizer, 2007; Darnall and Sides, 2008). The effectiveness of voluntary approaches appears to be contingent on credible threats of regulation (Khanna, 2001). Arguments against mandatory EPR, however, often are not focused on the possibility of wide-scale voluntary EPR, but rather on the use of other policy approaches (often municipal responsibility for recycling (e.g. SAIC Energy, 2012a)) or challenge the need for enhanced end-of-life management (e.g. Scarlett et al., 1997). This shifts the policy debate away from questions of the adequacy of voluntary approaches to one of policy justification and/or instrument choice, matters outside the scope of this report.

3.1.3. EPR and market failure

From an economic perspective, inadequate end-of-life management arises because of the failure to price externalities. "Getting the prices right," that is, internalising externalities so that market prices reflect environmental impacts, is thus the remedy that economic theory suggests as the approach of first resort. However, a variety of factors can make getting the prices right impractical or ineffective. Most notably, quantity-based user charges ("pay-as-you-throw"), a crucial element in a get-the-prices-right strategy, can provoke illegal dumping (Ino, 2007); without variable fees, the price signal to generators for appropriate waste management is muted.[8]

In concrete terms, there are two consequences of the market failure in end-of-life management that motivate EPR. First, producers face insufficient incentives to (re)design products and packaging to facilitate end-of-life management, i.e. to pursue design for environment (DfE). As noted above, however, because of the structure of many EPR systems, incentives for DfE have been limited. The evidence for the impact of EPR on product design is sparse (Tojo, 2004; Gottberg et al., 2006; Røine and Lee, 2006),[9] although there is some indication that EPR has an impact on material choice for packaging (see Chapter 4, Annex I and Bell 2013). Second, when levels of recycling or other appropriate forms of end-of-life management are seen as inadequate, EPR is one among a portfolio of policy strategies that can be used to raise the levels (Hickle, 2014a).[10]

It has been argued that governments turned to EPR in the early 1990s in part because of the failure of voluntary industry initiatives to remedy end-of-life management problems (Eichstädt and Kalhlenborn, 2002). This comports with a view that industry has the technical and managerial capacity, and notably, the resources, to change products and end-of-life management that are out of reach of government (Hickle, 2014a). That is, the argument for EPR in this view rests on matters of funding, institutional competence, and policy deficiencies rather than market failure.

The extension of the responsibility of producers to include end-of-life management is premised on a degree of privatisation of solid waste services. EPR was envisioned in part as a performance- and market-based environmental policy instrument (Lifset, 1993). In simple terms, producers would be assigned the responsibility for (some degree of) collection and processing for recycling, often with a quantitative target. Businesses would be left to organise the specific elements of those activities, using, it was hoped, the superior managerial acumen of the private sector. Municipalities and taxpayers would be relieved of the financial burden of recycling and related activities because the burden would be transferred to producers and consumers.

As EPR systems have been established around the world for various types of products, the notion of assigning a policy target and stepping aside to let producers self-organise to meet those goals confronted a variety of challenges and existing institutions. The result is that government involvement in the administration of EPR has taken a diversity of forms. In some instances the issues have involved misaligned incentives, in others the need for conventional government oversight. That governments play an overt role in EPR systems is not surprising. As noted in a recent review of market-based instruments in sustainability transitions (Parson and Kravitz, 2013), market instruments do not avoid authority based state regulation. Any policy is designed, enacted, implemented, and enforced by state authority and requires multiple design decisions by government… Governments must also decide how to monitor and respond to targeted actors' behaviour, including what mix of rewards, punishments, and other modes of influence to use.

3.1.4. EPR when some products have value

The question of market failure and the role of government intervention when some, but not all, end-of-life products have value raises complicated challenges for EPR. Over the past decades some types of waste electrical and electronic equipment (WEEE) have become valuable, that is, the discarded products have positive, rather than negative, prices in market transactions. This has been the case for (many) mobile phones and commercial information technology products for many years. More generally, it is business-to-business goods, frequently disposed in the institutional, commercial, and industrial waste streams, which are likely to have positive value. More recently, however, consumer WEEE such as desktop PCs and printers have become valuable primarily because of the potential for sale into second hand markets and the metals contained in their circuit boards as well as improvements in recovery technologies. Some types of packaging and printed paper also fetch positive prices.

At a foundational level, the presence of end-of-life products and materials with positive prices in waste streams regulated through EPR raises the question of whether there is in fact market failure and whether and how such wastes might be excluded from EPR obligations (Kunz et al., 2014). There are, however, practical challenges in differentiating EPR obligations according to whether market failure has occurred[11] or even on the basis of the current price of end-of-life products. These challenges include the tracking of wastes managed outside EPR systems and the definition of thresholds that might trigger the release from EPR obligations. A key challenge for governance and EPR policy is the potential for increased cost as the valuable fractions of the waste stream are shifted away from EPR systems leaving only the costly to manage. The same applies to collection of waste from remote areas. A second challenge is whether EPR systems could be designed to accommodate changes in the end-of-life product streams that they manage as the prices and profitability of various wastes shift over time. An approach that differentiated among waste according to value would depend as well on the effectiveness of the regulation of entities providing collection and processing services outside of EPR systems in order to ensure that positive prices of end-of-life products do not arise from inadequate environmental management.

Defining a positive price for end-of-life products

Most secondary materials (i.e. materials from end-of-life products that have been processed and made ready for use by industry) have a positive price. What are at issue in EPR are end-of-life products that have a positive value *prior* to collection and/or processing. A discussion of the challenges of defining what constitutes a "positive price" for the purpose of EPR is presented in Appendix 3.A.1.

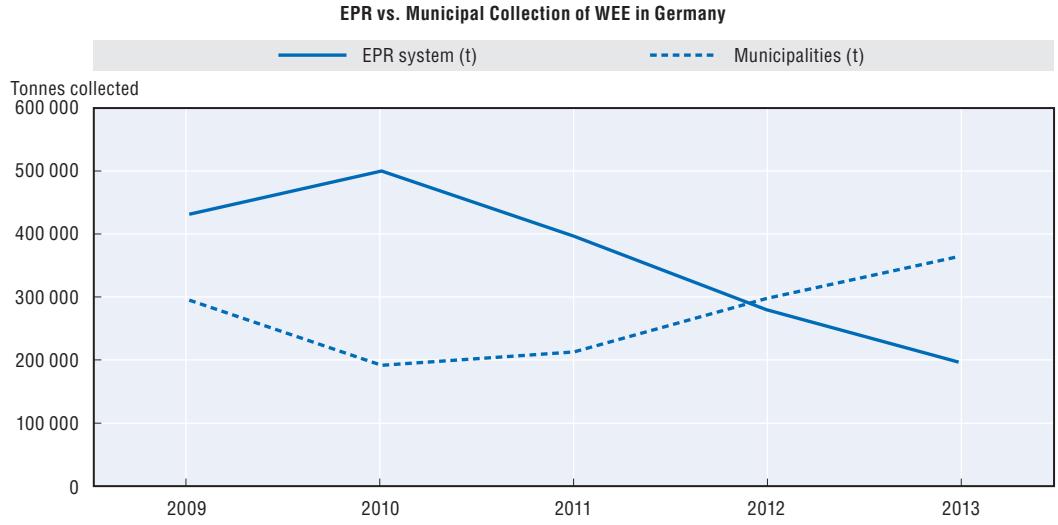
Leakage in EPR systems

The value of the end-of-life products has led to legal, semi-legal, and illegal diversion from EPR-managed systems. Many EPR systems report large flows of end-of-life products outside of EPR systems. In France it is estimated that only about one third of WEEE generated on French territory is handled by EPR systems, with between 45% and 75% moving through alternative channels and/or exported (Monier et al., 2013). Nearly half of the home appliances subject to management via EPR in Japan are estimated to move through non-EPR channels (see Annex H). According to Countering WEEE Illegal Trade (CWIT), a recent study commissioned by the European Union, of the 9 450 kilotons of WEEE generated in 2012 in Europe,

approximately 3.3 million metric tonnes are officially reported as collected and recycled, 3.15 million tonnes are collected and processed without reporting and/or under other non-compliant conditions, and 1.3 million is exported without reporting[12] (Huisman et al., 2015).

The leakage in the system occurs at many stages in the product life cycle. In some cases, municipalities formally opt out of EPR systems, choosing instead to contract with waste firms and recyclers to manage their recyclables. In Germany, for example, as much as 65% of the WEEE collected was done by municipalities that elected not to participate in EAR, the EPR system (see Figure 3.1).

Figure 3.1. **Share of German municipalities choosing not to manage WEEE through EPR (%), 2009-13**



Source: Stiftung Elektro-Altgeräte Register (2014), *www.stiftung-ear.de/en/*.

Leakage also occurs through "cherry-picking", that is, collecting or managing only the valuable components of the waste stream, leaving the costly portion to others. This occurs when municipalities, retailers, or other entities providing collection or drop-off sites bypass producer responsibility organisations by selling, formally or informally, the more valuable fractions of the collected recyclables to recyclers not participating with the PRO program. Still more informal cherry-picking occurs when brokers intercept consumers en route to drop-off or civic amenity sites, purchasing items that are valuable. It can also occur when generator-segregated waste is scavenged prior to collection. Diversion of end-of-life products from EPR systems also occurs on a more systematic basis in developing countries where peddlers purchase discards from households and other waste generators at a price higher than that offered by the formal EPR system. This, for example, has been a long-standing challenge in the establishment of the Chinese EPR system for WEEE (Yu et al., 2010a).

In the US, bottle deposit laws, considered by some but not all stakeholders as a form of EPR, have experienced leakage. Containers discarded in a state without deposit legislation are transported to nearby states that have such legislation (see, CalRecycle, 2015). Deposits are falsely redeemed causing considerable financial impact on the deposit redemption system (Paben, 2015).

Finally, leakage can occur through illicit export of end-of-life products, including WEEE sent to developing countries and end-of-life vehicles (ELVs) transferred to Eastern Europe

from other countries in Europe. The impetus for illegal exports ranges from lower labour costs available for dismantling of end-of-life products to lower, and thus less costly, environmental standards for processing to unadorned dumping.

The CWIT study found that offences related to illegal trade in WEEE involved 13 different types of actors across the EPR chain. These offenses include inappropriate treatment and violations of WEEE trade regulations, theft, lack of required licenses/ permits, smuggling, and false declaration of the load. The study also identified financial crimes including fraud, money laundering, and tax evasion connected to illegal WEEE trade (Huisman et al., 2015).

Leakage of various sorts is often accompanied by inadequate handling and treatment of wastes. It also poses a direct problem for EPR systems insofar as the systems find it difficult or costly to collect sufficient quantities of end-of-life products to meet regulatory obligations. A variety of remedies have been proposed. These include giving producers priority access by law to designated wastes as in Finland (Kalimo et al., 2015). Another remedy is to include wastes formally collected outside of the EPR system in the calculations of regulatory targets while also ensuring that non-PRO facilities meet the same environmental standards as those operating as part of the EPR system. This approach has recently been mandated as part of the recast of the WEEE Directive in the European Union (EU DG Environment, 2014). In Japan, local governments have been pressed to regulate informal collectors as a means of reducing leakage (Hotta et al., 2015).

3.2. Governance structures in EPR

To understand the role of government in the governance of EPR, it is useful to look at the EPR systems as a whole. All EPR systems include roles for government, producers, and providers of collection and processing services, but differ in the number of producer responsibility organisations (PROs) involved; which entities collect and distribute funds, and monitor and enforce compliance; and the responsibility and autonomy granted the participating entities. The organisation of EPR systems across the world, however, has tended to follow a handful of approaches: single PRO, competing PROs, tradable credits, and government-run.

Figures 3.2, 3.3, 3.4, and 3.5 depict, in a simplified manner, the legal and reporting relationships in the four representative approaches. These figures represent EPR systems for an individual product category in a jurisdiction[13] that has enacted EPR policies.

A country may have not only different EPR systems for WEEE and ELVs, for example, but those systems may have different governance structures. Not surprisingly, the amount of responsibility or activity assigned to each type of entity varies across EPR systems, e.g. monitoring may be an extensive and rigorous process in one country and much less elaborate in another. The diagrams show main types of entities involved in EPR and the legal and regulatory, data and reporting, and financial processes that connect them.

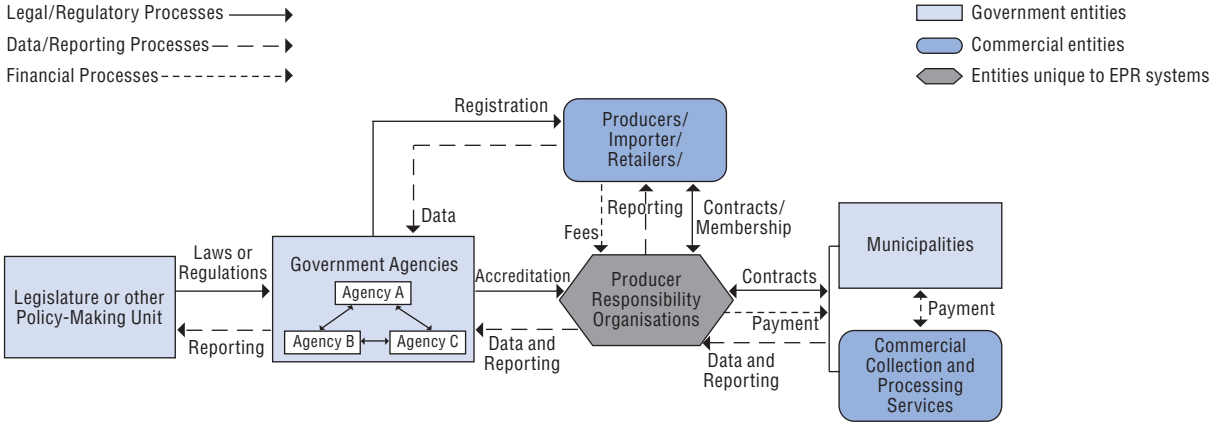
These diagrams are meant to be illustrative of generalised, representative approaches and do not reflect the variation and complexity present in systems across the world. Similarly, the boxes in these diagrams do not delineate details such as when government functions are separated among agencies (e.g. collection of fees in one, disbursement of funds in another as in China) and the many ancillary entities that can be involved, as discussed later, are not represented. To keep the diagrams comprehendible, governance relationships related to individual producer responsibility (IPR) and to end user industries

are not included. With as many as 400 EPR systems in existence worldwide (OECD, 2013b; Lifset, 2014), there are many variations of each of these approaches and many more legal relationships and data flows than shown.

3.2.1. Single-PRO systems

Particularly in the European Union and Canada, many EPR systems have assumed a similar structure: establishment of a PRO to organise and execute producer obligations; registries to identify obligated producers and to gather data for allocation of responsibility; government agencies to certify PROs; payment of fees by producers[14] to the PROs often on the basis of market shares of the obligated products; contracting for collection and processing of designated products by waste and recycling companies or municipalities; and oversight by governments. Examples of the single PRO approach include FOST Plus in Belgium for household packaging and Multi-Material Stewardship Manitoba for household packaging and paper. This is portrayed in Figure 3.2.

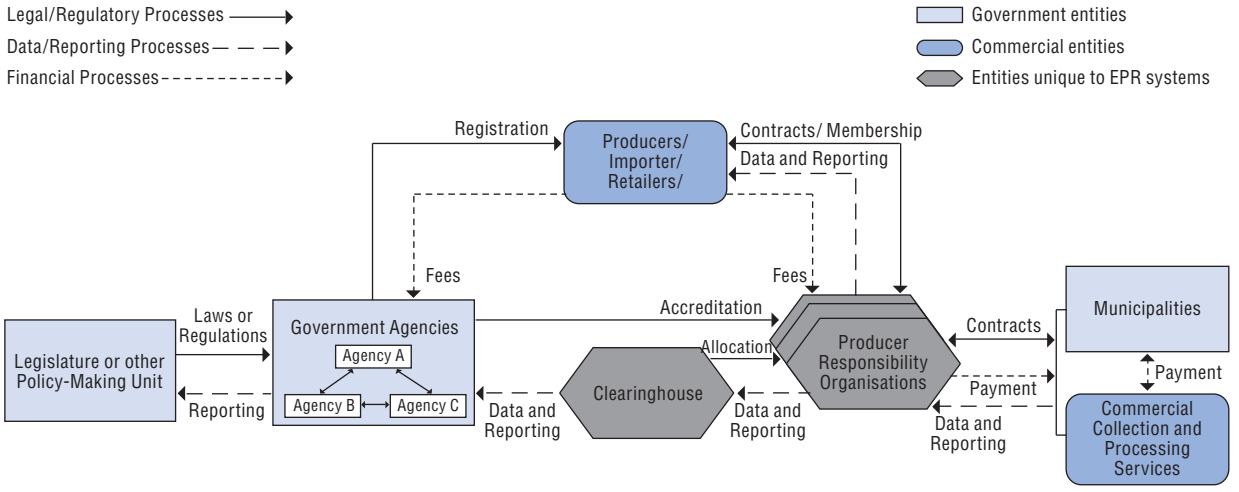
Figure 3.2. **One PRO with commercial and/or municipal collection and processing services**



Note: Material flows are not included for simplicity. The relationships related to individual producer responsibility (IPR) or end user industries are not shown. Municipalities may pay commercial providers for services and/or be paid for recyclables depending on the arrangements in the EPR system. Registration can be viewed as something the governments perform (i.e. they "register the producers") or something the done by producers (i.e. the producers register with the government). The depiction of the directionality is thus somewhat arbitrary.

This structure is typical of many of the EPR systems established in the first generation of EPR systems (Monier et al. 2014d). Collective management of EPR compliance and services – as opposed to individual compliance via individual producer responsibility (IPR; Kalimo et al., 2012; Kalimo et al., 2014)[15] – minimises administrative and logistical costs (Atasu and Subramanian, 2012). A single, monopoly PRO for an industry sector provides administrative simplicity for the producers and for the government regulatory entities and in smaller jurisdictions may reflect an effort to capture economies of scale. Contracting out for waste collection and processing by PROs reflects the business focus and/or absence of expertise in waste management services by both individual producers and PROs. Registries (discussed in § 3.3.6 on the role of clearinghouses) emerged because of the need to identify obligated producers and to obtain data on their sales in order to assess fees. In some cases, these functions are performed by a stand-alone organisation as shown in Figure 3.3. In others, the registry function is assumed by government agencies, as in Sweden where producers register with the Swedish Environmental Protection Agency for WEEE, or by PROs, as in the Canadian province of Quebec where Éco Enterprise Québec registers producers for packaging.

Figure 3.3. **Multiple PROs with clearinghouse and commercial and/or municipal collection and processing services**



Note: Material flows are not included for simplicity. The relationships related to individual producer responsibility (IPR) or end user industries are not shown. Municipalities may pay commercial providers for services and/or be paid for recyclables depending on the arrangements in the EPR system. Registration can be viewed as something the governments perform (i.e. they "register the producers") or something the done by producers (i.e. the producers register with the government). The depiction of the directionality is thus somewhat arbitrary. PROs may be non-profit or for-profit.

The relationship between the PROs and municipalities can take several forms (Quoden, 2014). The "dual" model, most well known in the German EPR system for packaging, places full operational and financial responsibility for collection, sorting, and recycling in the hands of producers. A collection system separate from and parallel to the existing municipal system – thus the term "dual" – is a conspicuous part of this approach. Municipalities may serve as contractors to the PROs, providing local services, but have no automatic role in the system. This approach is used for packaging in Austria, Germany, and Sweden.

In what is sometime called the "shared responsibility"[16] model, municipalities are responsible for collection and sometimes for sorting. The division of financial responsibilities varies across EPR systems. In some jurisdictions, operational responsibility may reflect pre-existing laws defining the role of local government in solid waste management, rather than a choice the design of EPR systems.

These approaches are discussed further below in the section on the role of municipalities.

3.2.2. Competing PRO systems

The number of arrangements for governance of EPR is vast and thus many do not follow the pattern shown in Figure 3.2. One important variant occurs when there are multiple PROs competing to service the same territory or population of producers (Figure 3.3) as in Germany for both packaging and waste electrical and electronic equipment (WEEE). (Note that this does not refer to jurisdictions with multiple PROs that service different, non-overlapping product categories within a larger industry sector or waste stream and thus do not compete. Such instances of multiple, noncompeting PROs occur, for example, when household and commercial packaging wastes are managed by different EPR schemes.)[17] In systems with multiple PROs, waste management companies sometimes own the PROs (Spasova, 2014). In most cases a clearinghouse is established in order to organise data collection and ensure appropriate burden sharing of collection (see discussion on clearinghouses in § 3.3.6).

In Germany, packaging for EPR was managed through a single centralised PRO, the Dual System Deutschland (DSD), from the initiation of EPR in 1991 until the beginning of the 2000s when the system shifted to multiple packaging PROs (10 as of 2015). The introduction of multiple PROs occurred in response to decisions by the German Federal Cartel Office and European Commission regarding anti-competitive practices (OECD, 2011). Changes in the EPR system for packaging were realised in 2003/4 through the dismantling of governance and contractual arrangements that had been established in 1993 in response to a financial crisis at the DSD (OECD, 2006, 2013b).

In contrast, in the United Kingdom competing PROs were an aspect of the initial design of the EPR systems for packaging and WEEE. Governance structures in the United Kingdom reflect shared responsibility among entities in the product chain and a market-oriented framework for targets specified in EU directives (Cahill et al., 2011). The United Kingdom EPR system for packaging subsequently evolved into a tradable credit system, discussed below.

3.2.3. Tradable credit systems

A third, distinctive variant in the organisation of EPR systems is based on the use of tradable credits. In this approach a producer's compliance with EPR obligations is accomplished when a producer is in possession of the number of credits for collected and processed end-of-life products equal to a set target. Accredited actors in the system collect a specific amount of the relevant products, and process or export them and thereby generate a credit.

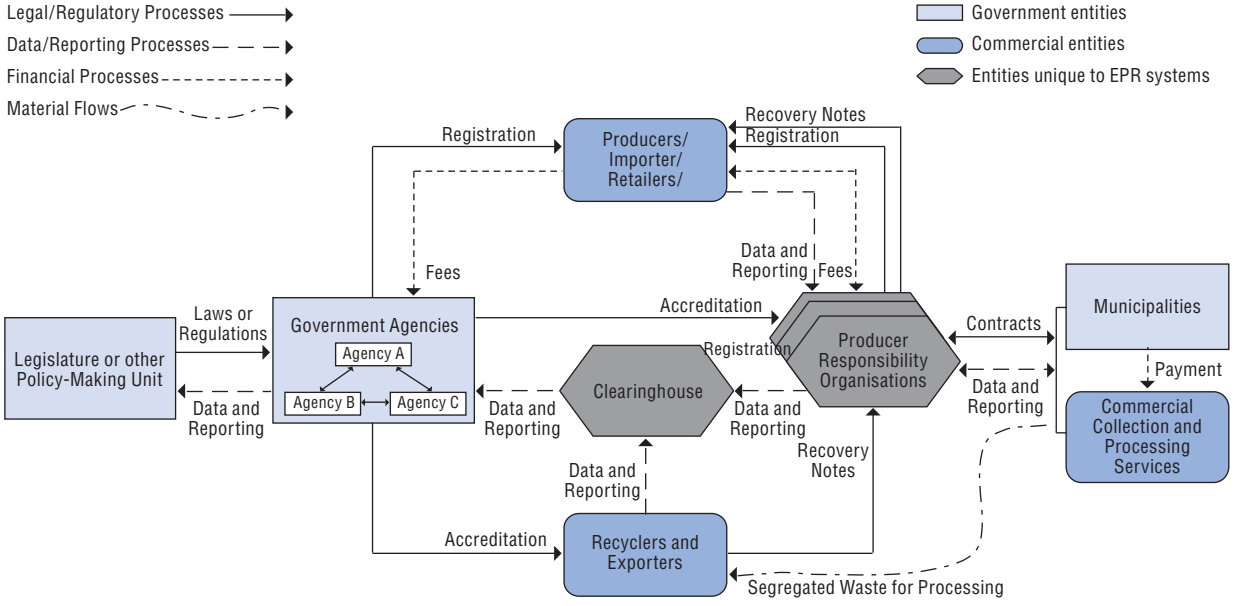
Tradable credits or permits as a market-based instrument have been widely discussed and used for a variety of environmental policy goals including air pollution regulation, management of water supply and quality, and grazing rights allocation (Tietenberg, 2007). They have not, however, been widely used for solid waste management (Salmons, 2002). In the early 1990s in the US they were proposed as a means to meet recycled content obligations for newsprint (Dinan, 1992). Tradable credit systems can minimise compliance cost and thus the burden to society by allowing those that can more cheaply perform a given task – e.g. reduce emissions or collect recyclables – to exceed regulatory targets and sell the credits to those for whom the task is expensive.

Among EPR systems, the United Kingdom packaging regime is notable in that it employs tradable credits.[18] In that system, national level obligations for collection and recycling of packaging are set to meet the requirements of the EU Packaging Directive[19] though some targets exceed the requirements of the Directive (OECD, 2014a). The obligations are divided among members of the packaging supply chain: 6 % to the packaging material manufacturers, 9% to converters (those that fabricate packages from the packaging materials), 37% to the packers or fillers (those put the product into the package), and 48% to sellers of the packaged product. Firms are allocated a share of the relevant obligation according to their position in the supply chain and the recovery target for the specific material used for packaging (ranging from 22% of wood up to 81% of glass).

The credits, called packaging waste recovery notes (PRNs) or packaging waste export recovery notes (PERNs), are generated when an accredited collection or processor (called re-processors in the United Kingdom scheme) processes or exports a tonne of packaging waste for recycling. Producers join PROs which purchase credits on their behalf from re-processors who in turn have acquired waste packaging from collection services or municipalities or private entities (generators).

Some aspects of the resulting governance system are similar to the multi-PRO systems shown in Figure 3.4. There are approximately 30 accredited PROs as of 2014 (Monier et al., 2014h). A clearinghouse, the National Waste Packaging Database, is employed, but rather than allocating collection routes, it facilitates information flow. It registers producers, accredits re-processors, issues the PRNs and PERNs, manages reporting, and monitors free-riding.

Figure 3.4. **Governance structure for tradable credits system**



Note: For simplicity, most material flows are not shown nor are export recovery notes. Municipalities play a limited role in sending waste to recyclers within EPR systems. Municipalities may pay commercial service providers for collection. Registration can be viewed as something the PROs perform (i.e. they "register the producers") or something the done by producers (i.e. the producers register with the PROs). The depiction of the directionality is thus somewhat arbitrary. PROs may be non-profit or for-profit.

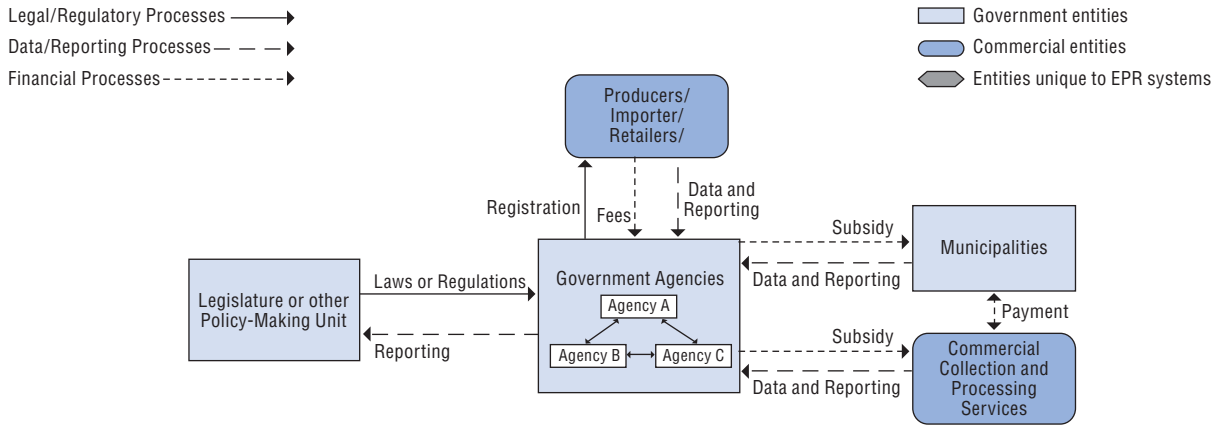
Municipalities have a diminished and less direct role relative to other types of EPR systems. In the United Kingdom system, targets can be met through the collection of packaging from commercial or household waste generators. It is often cheaper to obtain packaging from commercial generators than from households. In this respect, municipalities have no prerogatives to participate in the system, but if they collect segregated packaging materials they may sell them to re-processors or directly to the market. Figure 3.4 shows a schematisation of the United Kingdom packaging system, which allows multiple PROs (and even individual compliance, not shown on diagram).

The United Kingdom system is notable for the separation between producers and the verification of compliance by re-processors (OECD, 2014). That is, verification that the re-processors have recycled a given quantity of waste and done so appropriately is performed by the government. Neither PROs nor the producers have roles. In this respect, the governance is quite different from the two approaches described above insofar as there is no direct operational or managerial role for producers. The United Kingdom tradable credit system does not encompass producer obligations for public education or design for environment.

3.2.4. Government-run EPR systems

A fourth variant occurs when the government plays a more direct role in fee collection and disbursement (Figure 3.5) as in China for WEEE (see Annex D), and Chinese Taipei,

Figure 3.5. **Government-run EPR system**



Note: Material flows are not included for simplicity. Municipalities may pay commercial providers for services and/or be paid for recyclables depending on the arrangements in the EPR system. Registration can be viewed as something the governments perform (i.e. they "register the producers") or something the done by producers (i.e. the producers register with the government). The depiction of the directionality is thus somewhat arbitrary.

proposed for Thailand (Manomaivibool and Vassanadumrongdee, 2011), and some US states for all products subject to EPR. The advantages of government collection and disbursement of fees is the control that the government has over the execution of policy, often in the face of an industry that may not be mature enough to organise and manage a privatised system of governance. China considered an approach to EPR for WEEE that relied on PROs to collect fees and contract for waste services. The approach was rejected because of concern that a nongovernmental organisation would not be effective in collecting fees or dealing with substandard recycling operations without strong support from the government. Instead, the government chose to collect fees from producers directly in conjunction with value-added taxes (VAT) using the State Administration of Taxation (SAT) for domestic companies and the General Administration of Customs (GAC) for foreign companies and to disburse the funds via the Ministry of Finance (see Annex D; Tong and Yan, 2013; Tong, 2014). In Chinese Taipei, an EPR system that initially relied on PROs was shifted to a producers-pay-government-disburses model because of difficulties arising from false data reporting, financial scandals, lack of transparency, and poor design of PRO responsibilities (Ching-Wen, 2004; Fan et al., 2005). Thus, in both cases, collection and disbursement of fees reflected difficulties the countries experienced with the PRO-based approach common in Europe and Canada.

Some countries and stakeholders object to the labelling of such government-run systems as EPR. This can reflect a view of EPR as entailing a decision making or managerial role by products and/or a concern that taxes on producers under the auspices of EPR will be diverted by governments to non-EPR purposes. In Canada, government-run systems as shown in Figure 3.5 are not viewed as EPR. Instead, they are viewed as government-run product stewardship programs.[20] Only those systems where producers manage product take-back collectively or individually are considered to be EPR (Environment Canada, 2013; Bury, 2015).

Government-run EPR systems for WEEE also exist in several US states including the state of Washington, where a multi-stakeholder, quasi-governmental non-profit organisation, the Washington Materials Management Financing Authority, performs many of the functions performed elsewhere by PROs including setting and collecting fees from

producers (Gui et al., 2013). In Connecticut, the Department of Energy and Environmental Protection selects eligible recyclers and sets acceptable rates. The legislation allows for the participation of PROs, but none have emerged to-date (Metzner, 2015).

3.2.5. The role and legal status of producer responsibility organisations

Varied roles of PROs

Producer responsibility organisations, as entities established to execute EPR obligations on behalf of producers, are conspicuous in discussions of the governance of EPR systems. Because of their salience early in the development of EPR in the EU, Japan and Canada, PROs are often seen as one of the signature elements of EPR. As the discussion of EPR governance structures above indicates, however, the role of PROs varies widely and in some systems they do not exist at all.

PROs can be non-profit organisations (typically), government agencies (rarely), quasi-governmental non-profit organisations (QANGOs, occasionally) and for-profit firms (occasionally). In many jurisdictions, as in the Canadian province of British Columbia, PROs are legally obliged to have non-profit status (British Columbia Ministry of the Environment, 2006). For-profit PROs have emerged in some jurisdictions where multiple PROs compete, most conspicuously in Germany and the United Kingdom for packaging and WEEE. Monier et al. (2014d) find that 13 of the 36 EPR systems that they studied in Europe included for-profit PROs. It is not uncommon for such PROs to be owned in whole or part by waste management companies (Spasova, 2014).

In fact, for-profit status is not uniform. In the German system, some for-profit PROs are part of the vertical integration of producer-facing functions – such as collection of fees from producers and reporting to government authorities – with waste management functions. In what is described above as government-run EPR systems as in Connecticut and other US states, the same waste management functions are performed by firms that have no producer-facing functions at all. Further complicating the discussion, conventional for-profit waste firms are widely used by many different entities in EPR systems in traditional roles as contractors providing collection, sorting and processing services. Municipalities with collection and sometimes sorting and processing roles in EPR also frequently contract out those activities to conventional waste firms.

In such cases, the PRO is not paid by producers, but by another entity in the EPR system. A government agency in China, Chinese Taipei, or the state of Washington (US) contracts with such commercial entities directly without a PRO or municipality as an intermediary. In some cases, the relationship with the commercial entities is closer to one of permitting than to contracting-out. In the EPR system for WEEE in Vermont in the US, the state contracts with an entity, which can be for-profit or non-profit, that provides clearinghouse services, registering service providers and providing on-site inspections, training and outreach to the providers. The state also contracts with a WEEE recycler (Vermont Agency of Natural Resources, 2013, 2014). Producers pay fees directly to the state's Agency for Natural Resources, which, in turn, pays the clearinghouse and the recycler.

Thus for-profit PROs or PRO-like entities include:

- vertically-integrated PROs and waste services firms
- PROs without an affiliation with a specific waste services firm
- waste contractors to a government agency or related (non-PRO) intermediary established as part of the EPR system

- waste services firms permitted by a government agency as part of the EPR system
- waste contractors to a PRO
- waste contractors to a municipality.

For-profit vs. non-profit status

There is vigorous debate over the value and propriety of for-profit PROs including those that are vertically-integrated (the first two types of for-profit entity in the list above) and those that only provide producer-facing services. The main argument in favour of for-profit status is that the profit incentive will drive PROs to be efficient and, if the EPR system is properly structured, societal goals will be accomplished in a cost-efficient manner. Thus, the arguments in favour of for-profit PROs are intertwined with arguments supporting competition among PROs. For example, non-profit status could allow very high administrative expenses or inflated salaries that a for-profit endeavour would tend to mitigate because of pressure from shareholders. Some argue, however, that ownership of PROs by producers and/or careful monitoring of PRO finances and operations can drive efficiency (Bury, 2015). Competition among PROs regardless of their legal status could also reduce such unwanted effects.

A particular impetus for the emergence of competing PROs, which are often for-profit PROs, has been concern by producers over what are perceived to be excessively large financial reserves held by PROs. Data from the European Portable Battery Association, for example, showed that in the late 1990s some battery PROs were accumulating financial surpluses at a rate of 15% to 65% of revenue (Mayers, 2007). In another instance, some PROs responsible for WEEE in the European Union received fees based on the quantity of sales of new electrical and electronic equipment (EEE), while not spending commensurate amounts on the management of lower quantities of WEEE that were discarded, leading to large reserves. Some producers saw the size of the reserves as unwarranted and worked to introduce competing PROs as a means of exerting downward pressure on prices (fees).

Some organisations have very specific views in this regard. In January 2013 a group of packaging PROs[21] published an EPR Manifesto which outlined four main arguments against for-profit PROs[22] (EPR Club, 2013; Anonymous, 2013):

1. Distribution of profits would discriminate against non-shareholders within obliged companies.
2. Profits would create an incentive for PROs to offer preferential treatment to larger or more profitable participants.
3. Profits may create an entry barrier into the PRO for small producers or producers that will not increase profits.
4. Non-profit interests in a PRO's operations (such as education or prevention) are better served in the absence of profits as they may be costly.

Later in 2013, these organisations formed the Extended Producer Responsibility Alliance (EXPRA) as an association specifically for not-for-profit PROs. They have since argued, additionally, that for-profit operations may not comply with anti-trust laws, and monopoly charges could be levelled against the PRO. Further, they argue that waste operators should not be a part of a PRO's organisation as they have a profit interest in increasing the waste stream. Opponents of for-profit PROs also argue that the push for profitability generates incentives for, on the one hand, higher targets (Quoden, 2015) and, on the other, lower environmental performance as a means of cost-saving.

The assessment of the impact of for-profit PROs is stymied by the generally poor quality and incommensurable data on PRO performance (Monier et al. 2014d) and more specifically the dearth of detailed data in EPR systems with competing or for-profit PROs arising from concerns about sharing of proprietary data.[23] Monier et al. are the only authors found to explicitly evaluate the question of the effect of the legal status of PROs across multiple jurisdictions. They indicate that the for-profit status of PROs "does not entail any visible incidence on technical performance or on costs." More crucially, they argue that the conditions needed to ensure fair competition are more important than the legal status of the PROs. Ultimately, the status of PROs may not be decisive in influencing PROs pursuing excess profits (i.e. engaging in rent-seeking behaviour). In the most extreme case, the only difference between them may be that excess profits generated in for-profit PROs will end-up in shareholders' pockets, while those generated in non-profit entities will be used to pay for above market salaries, political posts, and "gold-plated" company facilities. Concerns delineated in the EPR Manifesto, in this view, could be addressed through regulation, corporate charters, or similar mechanisms.

This view is further supported by the way competition authorities are looking at this issue. Competition laws in many jurisdictions, including the European Union and United States, apply to undertakings regardless of their ultimate ownership – state, municipal or private – or profit/non-profit status (see Chapter 4). Under EU law, for example, any entity engaged in an "economic activity" is subject to competition law.[24]

Questions of the appropriateness of for-profit status are also tied to the emerging issue, discussed above (§ 3.1.4), of how best to manage waste streams that include both costly and income-producing products and materials. Profitable waste streams will be, unsurprisingly, more attractive to PROs and can provide a basis for commercial operation, sometimes without support from fees paid by producers. As with the question of competition, however, the performance of EPR systems with for-profit PROs where there are valuable waste streams are likely to reflect not only the legal status of the entities, but also the policies and structures of the EPR system. Regulations, for example, specifically targeted to cherry-picking of waste streams would have a strong impact regardless of the legal status of the PRO.

3.3. Key governance functions in EPR Systems

EPR systems include both familiar governance functions such as policy formulation, stakeholder consultation, monitoring, compliance promotion, and enforcement, and some that are more specific to the privatised dimensions of EPR, such as co-ordination through clearinghouses. This section provides summaries of both types of governance functions.

3.3.1. Policy formulation and evaluation

It is typically higher levels of government that have formulated and enacted the laws that mandate extended producer responsibility and – to varying degrees – dictate details that specify the structure and function of EPR schemes. In most cases it is the national governments that take on this role (as in Europe and East Asia) while in countries where the national government has not played a central role in EPR (Canada and the US), it is the state/provincial governments that have taken on this function. Conspicuously, the European Union as a supra-national entity has played this role in Europe (mandating EPR for packaging vehicles, EEE and batteries), with some aspects of policy left to member states. In a very small number of places in the US, local governments have enacted EPR laws (New York City; Alameda County, California; and King County, Washington).[25]

The filling-in of details regarding the structure and function of EPR schemes, where those details are not specified in the laws mandating EPR, is often left to administrative agencies (as with Green Manitoba in Canada) or to other levels of government (as with member states of the European Union). The boundary between the making of policy and the implementation of policy, conceptually, and especially in practice, is blurry. In many jurisdictions, governance functions are fully articulated in legislation, whereas in others they are promulgated as administrative regulations, delegated to non-governmental actors, or unspecified. Further, in some countries municipalities have more than an operational role, participating in policy formulation, and may have autonomy with regard to the degree to which they play a service role.

A crucial, though less widely noted, element in EPR governance is the evaluation of policy and program performance. Presumably the data obtained through monitoring (described below) can be used to assess not only the performance of individual actors in the EPR system, but also the performance of the overall system. Recent conspicuous examples of evaluation of EPR are the studies performed in preparation for the Recast of the WEEE Directive in the European Union (Sander et al., 2007; Huisman et al., 2007; Monier et al., 2014d). Policy and programmatic evaluation appear to be occasional rather than periodic in many systems and often hampered by inadequate data.

While policy formulation is primarily the role of governments, in line with the privatised dimensions of EPR, elements of policy may be delegated to non-governmental entities, especially producer responsibility organisations. This often includes the structure of fees paid by producers for the services organised by PROs and the selection of vendors of collection and processing services. While these decisions may not be viewed by some as "policy," the structure of fees in particular can be a central factor in shaping whether EPR generates incentives for DfE.

3.3.2. Operations

The privatising logic of EPR puts many of the functions in EPR systems in the hands of commercial and non-profit organisations. This includes both administrative activities such as tendering for collection and processing services and the operation of those services. Nonetheless, some local governments, primarily municipalities,[26] participate in collection and processing of designated products under the auspices of EPR systems (described above in § 3.2.1 in the discussion of systems of shared responsibilities). The role of local government is also a matter of considerable variation and debate across the world (as discussed further below in the section "*The role of municipalities in EPR systems*").

3.3.3. Stakeholder consultation

Consultation is important in obtaining information and perspectives of the entities in the EPR product chain (government agencies, producers, PROs, specialised organisations established as part of the EPR system, municipalities, waste management companies, recyclers, end user industries, and consumers/waste generators) as well as other interested and affected entities (government agencies indirectly involved, trade associations, civil society). Stakeholder consultation is especially important in EPR, as EPR creates new institutional arrangements among entities that may not have previously interacted. Insofar as EPR constitutes a system of private environmental governance, stakeholder consultation functions tend to shift to PROs and other entities in the EPR chain and are sometimes designed to mirror the administrative rulemaking activities of government bodies (Hickle, 2014a).

The consultation can occur at the formation of an EPR system and on an ongoing basis. Monier et al. (2014d), in their review of EPR in the European Union, found in most cases that there were no specific structures for stakeholder consultation, but that informal dialogue often exists. Consultation practices and organisational structures, where they do have formal status, vary widely. A consultation process may operate within the PRO or it can be external. Within a single PRO, consultation may be directly conducted through the governing board as in the case of COOU and CONOE, non-competing used oil PROs in Italy that have representatives of national government ministries in a minority role on their boards. In France, the EPR for graphic paper has an advisory committee that meets on a quarterly basis to review and approve the activities and strategy of Ecofolio, the PRO that has been accredited by the state. The commission has representatives from three ministries as well as from environmental and consumer associations.

The consultation body may be an organisation external to the PRO as in the cases of packaging in France[27] where the "Commission Consultative d'Agrément", composed of all involved parties (industries, consumers, NGOs, PROs, local authorities, waste managers, etc.) offers non-binding opinions to public authorities with the express intent of securing the proper functioning of the household packaging sector in France. In Belgium, the external organisation overseeing the packaging waste stream (the Interregional Packaging Commission - IPC) is composed of members from the regional governments who, in turn, receive non-binding opinions from the "Packaging Platform" that is composed of industrial associations. The IPC will also seek input from enterprises not represented by the packaging platform and exercises control over PRO activities as well as issuing permits to the PROs.

3.3.4. Registration and accreditation

Oversight is typically accomplished through a mixture of ex ante permitting-like processes and through ex post data collection.

While the terminology is not consistent around the world, "registration" often refers to the identification of the participants (producers) in the EPR schemes and acquisition of data on sales of products subject to EPR.[28] It is also a key element in identifying free-riders – producers that fail to participate in PROs or otherwise comply with EPR regulations. Registration is often performed by government agencies as in Finland where paper producers must register with the Centre for Economic Development, Transport and the Environment for Pirkanmaa (ELY Centre Pirkanmaa) (Monier et al., 2014j) or by quasi-governmental agencies as with the Alberta Recycling Management Authority in the Canadian province of Alberta[29] (CM Consulting, 2013). However, the process can also be administered by PROs as in United Kingdom where the registration information is compiled by PROs (called producer compliance schemes in the United Kingdom) and then transmitted to the Environment Agency or the equivalent in England, Scotland, Wales and Northern Ireland (Monier et al., 2014c).

A key means by which governments monitor activities in and the performance of the EPR chain is through the accreditation or certification of producer responsibility organisations. Typically, when a PRO seeks to operate in a given jurisdiction, the government requires that the PRO obtain permission by submitting an application that details the structure of the PRO and how it intends to operate. Many governments require that PROs periodically recertify and that process provides an occasion for the assembly and review of information. A related approach is to require, as a condition of operation, that the PRO submit periodic reports.

Comparison of accreditation criteria is difficult because the criteria are often stated in discretionary terms, that is, the certifying entity has the option to mandate that a PRO meet certain requirements, but is given flexibility as to whether in fact the requirements are imposed. In addition, the language in the relevant statute or regulation is often general, giving the certifying entity flexibility as to the specific form and extent of requirements that PROs face.

In many Canadian provinces, PROs must submit stewardship plans for approval by the relevant provincial government agency. They must also submit an annual report to the provincial government or environment agency on the program's performance. In the province of British Columbia, PROs must submit a product stewardship plan[30] and an annual report (Waste Reduction and Management Division, 2014). The producer[31] must review its approved plan every five years and either propose amendments or indicate that no amendments are necessary. The requirements for stewardship plans are described in the provincial recycling regulations and contain provisions on:

- stakeholder consultation
- collection system and consumer access including recovery rate
- consumer awareness
- management of program costs
- management of environmental impacts
- dispute resolution
- performance measurement.

The provincial recycling regulations provide an extensive list of factors that the director of the Ministry of the Environment of British Columbia may consider when deciding whether to approve the stewardship plan including its timeliness and effectiveness in meeting the goals, the geographical area and market into which the producer sells its products, stewardship plans of other producers for products in the same category, and the structure of financial and operational co-operation with other producers (Province of British Columbia, 2004; British Columbia Ministry of the Environment, 2006).

There is some debate in Canada about whether or not it is appropriate for governments to approve such stewardship plans. Approval implies responsibility which can be problematic for government if the EPR program encounters problems. Some argue that it may be better for governments to concentrate on monitoring the achievement of targets and leave the planning on how best to meet the targets to the PROs (Bury, 2015).

In Ireland, the Minister for the Environment, Community and Local Government is the governing body that approves PROs. Application for PRO status involves submission of documents related to governance and membership, a commitment not to discriminate against any producers with respect to size or location, and an assurance that it will co-operate with other PROs to achieve the environmental targets (Philip Lee, 2014; Gorecki, 2014). The Minister may outline specific conditions that the PRO must meet. These can include meeting specified targets, the composition and representativeness of the management board, expenditures for public education, awareness, and approval of amendments to articles of association, corporate governance and membership rules. The Department of the Environment, Community and Local Government (DECLG) has a management/oversight role ensuring that the PROs meet the targets (Gorecki, 2014).

The Irish approach is notable in that government has the prerogative to review and dictate aspects of the internal governance of PROs. In a recent review of EPR in Ireland, it was proposed the certification process be strengthened through a standardized code of corporate governance and the use of legal contracts ("service level agreements") between the government and the PROs to replace the letters of approval that are currently in place (Philip Lee, 2014).

The regulation of packaging PROs in Lithuania, like many countries grappling with EPR, evolved considerably. Prior to 2013, the statute simply authorized the establishment of PROs. Starting in 2013, requirements were increased to require that PROs conclude agreements with municipalities, packaging waste collectors, and producers. A Board of Control is mandated to provide oversight and enforcement of the agreements. Lithuania requires that a PRO must represent at least 25% of the manufacturers and importers supplying packaging for the domestic market in order to obtain a license to operate (Republic of Lithuania, 2012).

Despite their considerable differences in other respects, the examples above indicate that the requirements that are imposed through accreditation are often quite general, leaving the certifying entity discretion as to the specific conditions PROs must meet.

3.3.5. Collection and disbursement of fees

At the core of EPR are the fees paid by producers for collection, reuse processing, recycling of used and end-of-life products. Typically, the fees are collected by PROs, based on fee schedules developed using data obtained from the registries. The PROs contract for collection, reuse, and processing services on behalf of the producers who are their members or clients. The fee structures can be elaborate to reflect varied circumstances for levels of service and co-collection of non-EPR waste.

Where governments collect and/or disburse producer fees as depicted in the third governance structure (Figure 3.4), typically in systems that use forms of advance disposal fees (ADFs), the arrangements resemble conventional systems of government taxation and funding of societal activities. ADFs can be paid by the producer or by consumers at the time of purchase. Collection of fees by governments more directly involves governments in both the managerial and oversight dimensions of EPR systems. Some producers object to the collection of fees by governments worrying that the funds will be diverted to uses other than end-of-life management.

It is important to note that not all ADF-based systems are what might be called producers-pay-government-distributes approaches. While the visible fees paid by consumers in some EPR systems are a form of ADF, many such systems involve neither government collection of funds nor their disbursement. This is the case, for example, with many of the EPR schemes for WEEE in the Canadian provinces (Waste Reduction and Management Division, 2014) and the Specified Home Appliance Recycling Law in Japan[32] (Hotta et al., 2014). In the latter case, consumers pay fees at the time of disposal with the resulting funds managed by PROs (see Box 3.1). Some ADF-based systems, such as California's e-waste law, do not involve producers or producer funding at all (see Annex K) and thus are not a form of EPR.

3.3.6. Co-ordination through clearinghouses

In jurisdictions where there are competing PROs seeking to fulfil EPR targets (Figure 2.4), a neutral coordinating entity is needed to make sure that collection is provided

Box 3.1. **The Japanese Specified Home Appliance Recycling Law (SHARL)**

The Act for Recycling of Specified Kinds of Home Appliances was enacted in June 1998 and enforced in April 2001. It aims to achieve a reduction in the volume of waste and to improve material recovery from this source. The Act covers four categories of home appliances: air conditioners; TV sets; electric refrigerators and freezers; and electric washing machines and clothes dryers.

Under the act, each home appliance manufacturer has the obligation to take back and recycle their products when they become waste. To implement their obligations, manufacturers have set-up two competing groups, each of which brings together three or four of the most important producers and represents a similar share of the market. One of the groups has set-up its own recycling facilities, while the other contracts with existing operators.

Consumers and businesses that dispose of end-of-life home appliances have to pay both the collection/transportation and the recycling fee. Traceability is ensured by the use of home appliance recycling tickets (manifests) that are issued to consumers who paid the recycling fee. This manifest system ensures that waste home appliances are delivered to the original manufacturers of the products.

While there is no differentiation between the costs to manage individual brands within each of the producer groups, potential cost savings through efficient processing or product design remain with producers. Hence, there is competition between the two manufacturer groups over the minimisation of recycling costs.

The advantage of the vertical integration that results from the implementation of Japanese EPR for Household Appliances is that it creates a strong link between downstream management of end-of-life products and the producer. There is some empirical evidence that the system provides tangible incentives for eco-design (Tojo, 2004).

Source: Dempsey et al. (2010); Hotta et al. (2014) and Annex G.

everywhere it is needed, that cherry picking is avoided, and that there is a level playing field for all competitors. Without such co-ordination, there is the possibility that collection in some regions – especially rural areas where collection routes may be long and quantities of wastes small – may not be provided service because PROs find it overly expensive. Co-ordination also enhances efficiency by ensuring that competing PROs do not provide duplicative coverage, collecting end-of-life wastes from the same service area or collection points. Clearinghouses, often a separate non-profit organisation, but sometimes a government agency, thus help rectify undesirable incentives generated by competition among PROs. Clearinghouses can also collect data from producers or service providers, and provide a mechanism for managing proprietary data or identification of free riders.

The scope of services and organization provided by clearinghouses varies widely. Denmark, where the same clearinghouse, the DPA-System serves the EPR systems for WEEE, batteries, and ELVs is an example of a clearinghouse with a prominent role and multiple functions (see Box 3.2 for a description). United Kingdom EPR system for packaging, in contrast, clearinghouse activities are more limited, because of the structure of the tradable credit system.

Because the EPR system for packaging in the United Kingdom involves credits for recycling of packaging, two related entities are involved. As noted earlier, the National Waste Packaging Database provides a national on-line registration system for producers;

Box 3.2. **Centralised reporting, assignment of obligations, and control in a Danish clearinghouse**

In Denmark, the DPA-System serves as a registry and clearinghouse for PROs involved with WEEE, batteries, WEEE, and ELVs. Established in 2006 as WEEE-System and renamed as DPA-System in 2009, it is supervised by a 7 member board appointed by the Minister for the Environment.

The DPA-System administers centralized reporting and oversees the country's four PRO systems for business-to-consumer (B2C) and business-to-business (B2B) WEEE. Its duties include definition of market shares and collection obligations and auditing of PROs and producers if they are not members of PROs (i.e. pursuing individual producer responsibility). The DPA-System assigns WEEE collected by municipalities to producers or PROs. Municipalities report directly to the DPA-System, and producers report to DPA-System either individually or via PRO. PROs also regularly submit data from processors.

EPR for batteries in Denmark functions as a part of the EPR system for WEEE. In the case of batteries, however, SKAT, the Danish Tax and Customs Authority, collects data on the amount of portable batteries put on the market which it then forwards to DPA-System in contrast to the WEEE system where the data are sent directly to the DPA-system by producers.

The DPA-System is overseen by the Danish EPA and funded by producer fees. Because three of the PROs for WEEE also function as PROs for batteries and because the DPA-System oversees both WEEE and batteries, there is thought to be better engagement of the relevant actors (Monier et al., 2014a, 2014b)

accreditation for packaging re-processors and exporters; recording of the credits; and monitoring and reporting. In addition a small number of private internet platforms are maintained, for example by the Environmental Exchange, which provides a marketplace for the trading of credits (Monier et al., 2014h; OECD, 2014a), although the vast majority of credits are traded outside these platforms (Lange, 2015).

Ireland presents an intermediate case where some clearinghouse functions for WEEE are performed by the WEEE Register Society. As the name suggests, the Register Society is primarily a national producer registration body, set up to track which producers are placing EEE on the market. It is an independent, industry-based body, overseen by a management committee that includes including government agencies, and owned by producers (Monier et al., 2014e). The WEEE Register Society is also responsible for notifying the EPA of potential non-compliance with WEEE regulations and for verification of visible environmental management costs (vEMCs) that are applicable to WEEE (i.e. from products put on the market prior to the enactment of the WEEE Directive). As such, it fulfils one of the primary functions of a clearinghouse by supporting the identification of free riders. One distinction from other clearinghouses is that the WEEE Register Society does not determine that market share of individual producers. Rather, determination of market share and financial liability is contracted out to a private entity to ensure confidentiality through data submitted to the "WEEE Blackbox" website (*www.weeeblackbox.ie/website/faq.html*).

In some EPR systems, clearinghouses, rather than PROs, serve as the primary point of contact for municipalities. According to a recent study for the European Union, national clearinghouses, either as independent entities or government operations exist for all EPR systems for WEEE and for packaging in Austria and the United Kingdom (Monier et al., 2014d).

3.3.7. Monitoring

Monitoring, both public and private, is needed to ensure effective policy implementation, as a prerequisite for enforcement, and to inform subsequent policy assessment and debate about the effectiveness and future development of EPR. Monitoring is also a component of co-ordination. Key functions in EPR systems such as assignment of service territory and pick-up routes require information for operational purposes. Monitoring focuses on three key entities in the EPR chain: producers, PROs, and collection and processors including municipalities. Information about producers mostly relates to participation (to address free-riders) and sales or market activity (to allocate responsibility and fees). The information needed about PROs is more extensive and focuses on the extent of activities and performance. Information about service providers focuses on operational results, environmental compliance and financial activities. Monitoring of an EPR system thus requires both technical and financial data. Monitoring of non-EPR actors is also important in addressing leakage of end-of-life products and materials outside the EPR system (see §1.4.1). The effectiveness of the system will depend on transparency, auditing, harmonisation, and enforcement (described below).

Technical performance data

Information on technical performance is mainly related to collection and processing quantities but can also include environmental performance such as emissions and practices at processing facilities. Such data are likely to include (at least):

- *Quantities of products placed on the market by producers or discarded by waste generators* – Such data are usually the basis for allocation of physical or financial responsibility and thus calculation of producer fees. Data on the quantity of products placed on the market can be obtained from individual producers and/or from statistical agencies and industry associations.
- *Collected quantities* – A central task of PROs is to collect and report information about the quantity of recyclables managed under its auspices. In EPR systems where producers are permitted to exercise responsibility without joining a PRO (i.e. a form of individual producer responsibility, IPR), provisions need to be made as well for the reporting of data directly from such producers. Reporting of quantities collected through a PRO or by an individual producer does not provide data on collection and processing of recyclables handled outside the EPR scheme. As noted above, many jurisdictions estimate that a large proportion of targeted recyclables that are collected do not go through the PRO chain; thus such data are important for policy assessment and increasingly a concern in management and EPR systems.
- *Collection activities and accessibility* – The number of collection sites, frequency of collection, and related factors indicate accessibility and convenience of EPR services for waste generators.
- *Sorted and processed quantities* – As with the collected quantities, data on the sorting and/or processing of recyclables are often assembled by PROs (or individual producers under IPR) from operators for transmittal to government agencies. Particularly important here is clarity about whether data refer to quantities arriving at a given facility (inputs) or quantity departing the facility (outputs) with the difference being the residues from the processing activities (Waste Diversion Ontario, 2010).

- *Destinations of various waste flows (collection, reuse, recycling, end use, incineration, landfill, etc.)* – Information on all flows in an EPR chain improves the opportunities for government oversight. Traceability is a key concern as it can be difficult for government agencies to identify all the entities in the chain, especially processing facilities and end users (Monier et al., 2014d). In the Canadian province of British Columbia, mass balances are included in PRO reporting for WEEE to check for discrepancies in reporting.[33] Traceability can be hindered by governments' lack of legal authority to require tracking outside of jurisdictional borders.
- *Residue quantities* – Residues can include both materials that are inappropriately captured in collection (non-recyclables) and appropriate materials in a form and shape that cannot be further handled (small fragments). Residues have an impact on costs insofar as they increase processing activities and require disposal. They also serve as an indicator of the quality of collection practices and processing technology.
- *Consumer awareness* – Knowledge of the availability and functioning of the EPR system is an important driver of collection and contamination rates and of public participation in policy formulation. In Canada, surveys of consumer awareness of EPR for WEEE are conducted regularly (Kerr, 2015).

These data can then be used to calculate recycling and related rates and are an obvious and critical component of evaluations of cost-effectiveness.

Financial and programmatic data

Financial information for monitoring is more varied because of the differing configurations of EPR systems and pressure for protection of proprietary commercial information from business participants. Such data are likely to include:

- costs incurred by entities in the EPR chain
- payments made between entities in the chain and revenues from sales of used goods and secondary materials.

Cost information is important because it serves as the basis for subsidies and payments between members of the EPR chain, provides information on assets and financial reserves that may accrue in the systems, and supplies a key ingredient in the oversight of the system. Data on payments provide information complementary to technical data on how the EPR system is functioning and where policy intervention might be needed.

Non-quantitative information is also important regarding the structure and rules of organisations, corporate governance, membership criteria, management of financial resources, reporting procedures, R&D and design for environment initiatives, and outreach activities.

Transparency and auditing

To be effective, monitoring needs to provide transparency and be reliable. Transparency involves documenting and disclosing the manner in which entities involved in EPR operate and how effectively and efficiently they do so. This in turn means that the data must be generated, collected, collated, stored, verified, and made accessible or distributed to the appropriate stakeholders. The reliability of the information is often ensured through auditing performed by governments or independent third parties. In the Austrian EPR system for packaging, for example, the government audits not only PROs but also individual producers (Monier et al., 2014d). In Chinese Taipei, rigorous auditing of producers and of

recyclers is a key component of the EPR system because of difficulties experienced in the 1990s with false data reporting and financial irregularities. The subsequent use of individual item counting, mass balances, 24-hr closed-circuit television monitoring, and other methods have helped to maintain low rates of fraud among recyclers (Fan et al., 2005).

Like other administrative processes, a trade-off exists between detail which enables better monitoring and understanding of the performance of EPR schemes and the cost that the detail engenders. In recent guidance proposed for the EU, a set of actions was recommended regarding transparency and monitoring of PROs (Monier et al. 2014d):

- provide a formal authorisation (or recognition) procedure for PROs
- provide monitoring procedures and audits over PROs, including self-control procedures
- set up a system of compliance promotion and enforcement that effectively discourages free riders
- define ambitious targets and develop the indicators and reporting obligations to allow their monitoring
- ensure the quality of statistics reported
- define and enforce monitoring procedures on quality of recycling for exported materials.

As noted earlier, a central tension regarding transparency relates to the disclosure of financial and technical information in systems with for-profit PROs and with respect to commercial collection and processing firms. For-profit PROs argue that disclosure of data about their fees and their business relationships in the EPR chain jeopardises their competitive positions and that the goal of appropriate performance is met through monitoring of technical outcomes (e.g. quantities collected or processed) and the competition in the market. Sirena (2013) argues that this tension could be addressed by requiring disclosure of costs when a PRO has a market share exceeding a specific threshold (e.g. 50% of the products placed on the market). Collection and aggregation of data by a neutral third-party organisation and/or use of non-disclosure agreements by the organisation collecting data could also be used to address this challenge, as was done with a recent study prepared for the Irish government (RPS et al., 2014).

Harmonisation

Harmonisation of reporting requirements and especially data format and definitions is needed if benchmarking of performance is to be feasible and to minimise the cost of compliance of the entities in the EPR chain (Monier et al., 2014d). This is a form of co-ordination between, rather than within, EPR systems and addressing either the same or different product categories. At the government level, the Canadian province of British Columbia and the US state of Maine have enacted a product stewardship framework law that defines key parameters of EPR systems as new product categories are considered. Eight other US states have considered such legislation (Hickle, 2014b). Inter-state harmonisation has been pursued through a model law for paint EPR, adopted by 4 states in the US. Canada and Australia both have federal guidance that, while largely voluntary, provide impetus for consistency across provinces/states and product schemes (CCME, 2009). In Canada non-governmental entities have also played a role in harmonisation: the electronics and retail industries have established a new governance structure, Electronics Product Recycling Association (EPRA), which has taken over the management of the PROs responsible for WEEE in eight of ten provinces, bringing common standards, management structures and reporting to most of the country (Waste Reduction and Management Division, 2014).

Organisations such as the WEEE Forum and EXPRA, which represent non-profit PROs in EPR systems for WEEE and packaging respectively, function like trade associations providing platforms for sector-wide communication and initiatives as well as political representation.

Efforts at harmonisation are also occurring with respect to treatment standards in recycling. WEEELABEX, an initiative of the WEEE Forum, is creating a common set of European standards for the treatment and recycling of electronic and electrical waste and for the monitoring of the processing companies (WEEELABEX, 2013). CENELEC, the European standards body for the information technology industry, is also working on collection, logistics, and treatment requirements for WEEE (CENELEC, 2014). Each European country will separately determine whether to require this standard or others, in order to participate in the EPR scheme. These initiatives are an attempt to both raise the floor with respect to recycling practices for WEEE as described in the section on enforcement below, and to level the playing field for PROs. Facilities operating outside the EPR chain may perform at a lower standard, putting the EPR schemes at a competitive disadvantage. Harmonised standards also help reduce potential spill over effects and eliminate the incentive to buy and discard in different jurisdictions. Mandatory compliance with standards arising as a result of legislation, contracts, or market practice, however, may be constrained by competition law and international trade rules (see Chapter 4). An example of efforts towards consultation, co-ordination and harmonisation in the Belgian packaging EPR system is provided in Box 3.3.

Box 3.3. **Consultation, co-ordination and harmonisation in the Belgium packaging EPR system**

In Belgium, the Interregional Packaging Commission (IPC) is responsible for harmonised management of packaging waste among the 3 regional governments (Flanders, Wallonia and Brussels). The IPC is in charge of permitting of the 2 packaging PROs, inspections of service providers, and aggregation and reporting of data (Monier et al., 2014g). The establishment of the IPC reflects the need for co-ordination among semi-autonomous regions of Belgium (Marques et al., 2012), but also creates a platform which provides a ready basis for oversight, harmonisation, and management of proprietary information. Other entities in the Belgian system operate between the municipalities and the PRO: inter-municipal organisations ("intermunicipalities") performing inter-municipal co-operation (IMC). These organisations seek to increase the efficiency of waste services by sharing know-how and operations. The legal form of the IMC is governed by regional law. Studies of the cost efficiency of the IMC have been conducted, but correlation between governance and efficiency was not assessed (De Jaeger and Rogge, 2014).

3.3.8. Enforcement

Enforcement involves the identification of violations and imposition of sanctions. In the context of EPR, enforcement is principally concerned with failure to achieve collection and related targets, free-riding by producers, compliance by PROs with respect to managerial and fiduciary responsibilities, diversion of recyclables to inappropriate channels, and conformity with environmental regulations by collectors and processors of the relevant wastes. Consumers, importers (acting as producers), retailers (if obligated to accept end-of-life products), municipalities and exporters can also be non-compliant and the subject of enforcement actions. A recent study for the Irish government argues that the extent of non-compliance problems depends on the design of the system and the type of product

involved. "Systems with a large number of producers have a higher potential for noncompliance than more concentrated markets. The scope for non-compliance is greater and more complicated to deal with when a large number of producers are part of a long production chain" (RPS et al., 2014). Packaging systems are especially vulnerable in this regard.

Enforcement is important to increase compliance with EPR-related obligations, but also to ensure a level-playing field among competing producers, PROs, and service providers. Failure to provide consistent enforcement creates undue advantages to the entities failing to meet obligations and also can increase burden on those facing collective targets. Producers, for example, that evade payment of fees to PROs both reduce their own expenses and increase the costs that are borne by other producers. If evasion of fees is extensive, the financial viability of an EPR system can be at risk (Kalimo et al., 2012).[34] Similarly, if collection or processing services operating outside of the EPR system do not face the same degree of enforcement, EPR schemes are disadvantaged and, as mentioned above, the level of services may be reduced. (See section "*The role of municipalities in EPR systems*" for additional discussion in the context of leakage). Enforcement in such cases can include monitoring of collection points maintained by retailers and municipalities (RPS et al., 2014, 343).

The legal authority to impose penalties is typically reserved to governmental agencies. In the US, however, a EPR model law for batteries under development by the Product Stewardship Institute and other stakeholders includes a right of private action, that is, producers who would not otherwise have legal standing to sue entities involved in EPR for failure to perform, are granted the right to do so (Nash and Bosso, 2013). In a related vein, entities in the EPR system can play a role in identifying violators even without having formal legal authority. This is especially the case with respect to free-riding by producers (i.e. avoiding payment of fees and participation in EPR schemes).

In the European Union, there is widespread agreement among stakeholders that member states and PROs should both be responsible ("co-responsible") for the monitoring of EPR schemes, and should ensure that there are adequate means for enforcement , but there is less consensus as to the specifics of the division of responsibilities and costs ("co-funding" of enforcement) (Monier et al., 2014d).

Sanctions can range from criminal and civil penalties, fees, revocation of the right of a PRO to operate to public disclosure of non-compliant entities (e.g. free-riding producers) and successful prosecutions. There is little systematic and especially cross-national research on enforcement mechanisms and especially on the use of sanctions and penalties in EPR systems.[35] Analyses of illegal export of WEEE, ELVs and other wastes, however, have been conducted (e.g. Miller et al., 2012; Bisschop, 2012), but are typically not tied specifically to such exports arising from EPR systems. An issue with respect to sanctions that is specific to EPR arises, however, when a jurisdiction has a single PRO for a given product category. In such circumstances, the threat of revocation of a PRO's license to operate (i.e. its accreditation) is less credible than it might otherwise be. A contingency fund held in reserve by PROs equal to approximately one year's operating costs is used in Ireland to mitigate the difficulties in replacing a PRO (RPS et al., 2014).

In some countries, municipalities have enforcement roles. This can include monitoring the performance of EPR schemes, especially shared sites and activities (e.g. collection points and civic amenity sites), and permitting and sanctioning collection and processing activities within their borders. For example, in Ireland the collection points used by distributors must be registered with local governments (RPS et al., 2014). At the

same time, municipalities that play an active role in the EPR chain are sometimes monitored by PROs primarily to control costs. National antitrust and competition authorities may also monitor the activities of PROs and service providers in an effort to ensure competitive markets in PRO services, collection, sorting and processing of wastes. Competition authorities may take participants in an EPR system to court or otherwise raise objections to the existing structure and practice of an EPR system (see Chapter 4).

3.4. Governance structures and allocation of tasks in EPR systems

3.4.1. Patterns in the allocation of functions

Typical allocation of governance functions

The four typical governance structures described earlier in this report – single PRO, competing PROs, tradable credits, and government-run – are only partially correlated with the allocation of governance functions in EPR systems. More broadly, irrespective of the governance structure used, the assignment of governance tasks related to accreditation, monitoring, reporting and financing of administration described in this report shows wide variation across EPR systems and jurisdictions. Notably, several functions are executed by government agencies, clearinghouses and PROs without a conspicuous pattern across jurisdictions:

- registration of producers
- collection of sales and import data
- certification of PROs
- allocation of collection territory; and
- monitoring of recyclers and auditing.

In contrast, the assignment of some tasks has an obvious logic: PROs cannot certify other PROs,[36] so this task falls to government agencies or, where they exist, sometimes clearinghouses. There is obvious need for clearinghouses in a multi-PRO system, and in many cases in government-run systems there are no PROs. Enforcement, because of the legal powers required, is almost always the prerogative of governments. Table 3.1 summarises the variety of assignments of governance tasks.

Table 3.1 indicates variability of the assignment of key tasks in governance among entities in EPR systems. For example, multiple types of entities may play a role in co-ordination and monitoring. That variability and the absence of commentary in cross-jurisdictional analyses of EPR systems about optimal arrangements suggest that those arrangements need to reflect local conditions and that best practice may lie elsewhere. Put another way, for several key governance tasks, with modest exceptions there is not clear evidence as to which sort of entity should take on a given function in an EPR system.

At the same time, analysts of EPR have argued that clear delineation of roles among stakeholders is important to good governance (e.g. Kalimo et al., 2012; 2014). Monier et al. (2014d) suggest that while there is no "one size fits all" solution in the allocation of responsibilities, "achievement of good…EPR performance is a result of each stakeholder's contributions toward a common goal and precise roles should be defined at the national scale, in accordance with the respective financial and/or operational obligations." Quoden (2015) points to the "Basic Document on the Monitoring of Packaging",[37] a document with legal status in the Netherlands that defines roles in detail, as a model for clear allocation of functions.

Table 3.1. **Typical allocation of governance tasks in EPR Systems**

Governance Function	Government*	PROs	Clearinghouses	Commercial Waste Companies	Municipalities	Specialized External Entities
Policy formulation and evaluation		**		**	**	
Operations						
Stakeholder consultation						
Registration (of producers)						
Accreditation (of PROs)						
Collection & disbursement of producer fees						
Co-ordination						
Monitoring						
Enforcement						

Key:
- Primary entity performing functions
- Entity sometimes performs function
- Entity rarely performs function
- No examples of entity performing function found

* Government refers to public sector entities involved in policy formulation and oversight. Does not include local governments solely involved in service delivery.
** Governments take the lead in policy formulation, but key stakeholders are often involved.
***Municipalities have ongoing interaction with citizens even when they don't have a central role in stakeholder consultation processes.

The role of municipalities in EPR systems

The role of municipalities in EPR systems is a contentious issue in many jurisdictions. One of the motivations for EPR is to relieve local governments (and tax payers and rate payers) of the burden of managing many waste streams. However, the form of this shift raises important questions for all parties in the EPR chain as it also implies a shift in control and in revenue and cost streams.

Municipal control. Municipalities argue that they bear legal or other obligations for waste management and public health in their communities and thus should have a major say in how waste is managed under EPR (Council of European Municipalities and Regions, 2013; Municipal Waste Europe, 2013). Municipal waste collection is also often an important source of local employment, one which local governments are reluctant see shift to the control of outside entities (Tojo and Hansson, 2004). In addition, local governments may have stranded assets if control shifts to PROs. That is, existing capacity in government-run or -financed facilities for material sorting or disposal may be displaced by facilities run by other entities; the existing facilities may be idled with a loss of revenue and on-going financing costs. The issues of employment and stranded assets are likely to pose a greater challenge for local governments that provide waste services directly than for those that contract with commercial providers for those services.

The central issue in most cases revolves around whether local governments provide EPR-related collection services and the extent to which their costs are covered by PROs. Where the cities see their role as crucial in ensuring public health and democratic control, others argue that efficiency and innovation are more likely to occur where industry has control (Valiante, 2015).

Other aspects of the municipalities' role, such as funding for public outreach and the extent of consultation regarding policy and operations in the EPR systems, are also at issue. Participation of municipalities in the different stages of EPR varies in several ways; it may:

- be mandated or optional
- be an exclusive prerogative of the municipality or may be conducted in competition with other collection and processing service providers
- include an oversight function as well as an operational role
- be financed by the industry or by the municipality itself; financing may be contingent on goals or performance.

With respect to service provision, municipalities typically function in one of two ways. In some EPR systems, described as "shared systems" in § 2.2.1, they have the obligation or prerogative to provide collection and sometimes sorting of designated wastes, that is, they have the option to provide (or contract for) the services. This is often the case in the packaging arena where municipal collection and recycling programs sometimes pre-date EPR regulations and producer obligations. Frequently the municipalities are reimbursed in whole or in part for the cost of their services and with rules governing amount of reimbursement. In other EPR systems described earlier as "dual systems", they may compete to provide collection and sorting, but the PROs are not obliged to use their services. These two approaches are illustrated in Figure 3.6.

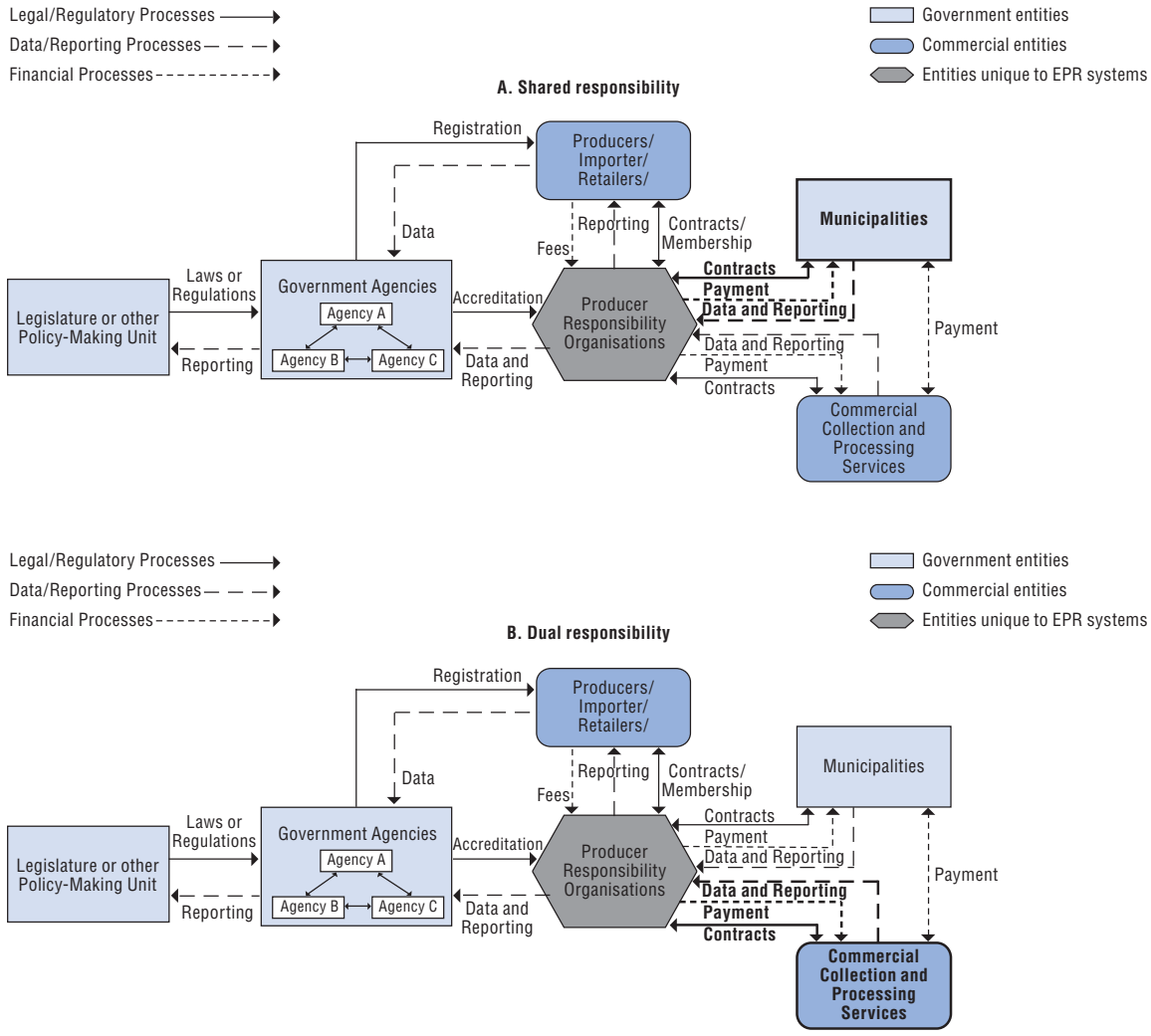
Costs and Cost Control. A key point of contention is cost. In systems where municipalities have the prerogative to provide services, producers (and PROs as their agents) may not be able to control costs to their satisfaction. As a result, producers have contested the very assignment of costs as with the local collection of WEEE.[38] In some instances producers may seek to exercise extensive control of local collection and processing, as in the EPR system for packaging and printed paper in the Canadian province of British Columbia where producers have been given full financial and operational responsibilities for collection and processing (Elliott, 2014; Sinoski, 2014). In the Canadian province of Ontario, a formal arbitration process was conducted between the municipalities and the packaging PRO because of conflicts over what municipal costs were eligible for producer funding (Armstrong, 2014). The arbitrator found in favour of the municipalities, but the fundamental issues were not resolved (Bury, 2015).

Tensions over the cost of services provided by municipalities reflect both questions of whether a given type of service is delivered in a cost-effective manner and differences over what level of service should be provided. In the latter case, a municipality may want to provide frequent collection services or provide a dense network of drop-off (bring) sites, greater than a PRO judges to be necessary to meet EPR targets.

Some EPR systems have established reference costs for municipal services which provide a benchmark or limit regarding what constitutes reasonable costs. Reference costs can be configured based on a variety of strategies:

- reimbursement of the municipality tied to quantity or percentage of designated materials collected
- adjustments to reimbursements tied to quality of material collected (i.e. level of residues)
- definition of a standard cost for individual elements of municipal activities
- definition of a standard level of service beyond which reimbursement is not provided or limited, or
- bonuses for additional services (e.g. public outreach).

Figure 3.6. **Municipal roles in collection and sorting**



Note: Commercial waste services may be used by PRO when municipality chooses not to participate or by municipality when it contracts out services. Registration can be viewed as something the governments perform (i.e. they "register the producers") or something done by producers (i.e. the producers register with the government). The depiction of the directionality is thus somewhat arbitrary.
Note: PRO may contract with municipality but is not obligated to do so. Bold figures indicate primacy of municipality (2.6a) or commercial services (2.6b).

3.4.2. Advantages and disadvantages of governance structures

The PRO operating in a single-PRO governance structure (Figure 3.2) is almost always a non-profit PRO (one of the few exceptions is the Italian PRO for used oil). The single-PRO structure has the advantage that monitoring, reporting, and consultation are simplified and transparency tends to be greater than with multiple PROs (EXPRA, 2013). At the same time, the absence of competition among PROs in such a structure is argued to lead to higher prices (i.e. higher fees charged by the PROs to the participating producers). There are also concerns that a single PRO may exert market (monopsony) power over waste service providers (see Chapter 4) or may favour large producers at the expense of smaller ones. The strengths and weaknesses of a single PRO model are difficult to disentangle from those that arise from the choice as to whether PROs should be non-profit or for-profit (see section "*For-profit vs. non-profit status*" above).

Box 3.4. **Assignment of costs and level of service: Packaging EPR in France**

In the EPR system for packaging in France, municipalities are assigned the tasks of separate collection and sorting of waste packaging from households. As of 2012, a target of 75% recycling of packaging waste had been adopted and 80% of the net reference costs for an optimized service of collection and sorting incurred by the municipalities are reimbursed by Eco-Emballages, the PRO and French Green Dot system responsible for household waste packaging provided that the 75% target is achieved. Most of the remuneration paid to municipalities consists of i) a payment varying according to the level of performance achieved (kilograms of recycled packaging per inhabitant per year) (Cabral et al., 2013), ii) a payment for public outreach activities and iii) a payment for the reporting of their costs regarding environmental, economic and social targets so as to incentivize municipalities to monitor better their performances. Contracts between municipalities and service providers have a term of six years (French Ministry of the Environment 2014). Municipalities can issue tenders for take-back of materials (i.e. manage the contracting for services themselves), but Eco-Emballages will also provide a take-back guarantee with a take-back operator designated by the PRO. In that case, material take-back prices and contractual arrangements are applied in the same manner to all municipalities and prices and terms are not negotiable (Monier et al., 2014e). A recent review suggests that there may be too many sorting centres, that there is a lack of transparency regarding municipal costs, and that the reference cost calculations do not reflect variation in costs across municipalities. The result is that the reference costs appear to be higher than actual costs (Monier et al., 2014e). The long service contracts (six years) make changes in the organisation of EPR chain slow.

According to the recent study by Monier et al. (2014d), multiple PROs manage WEEE in all seven of the EPR systems examined. Batteries are also frequently managed by multiple PROs. In contrast, end-of-life vehicles (ELVs) in the systems studied were always managed by a single PRO. EPR for other product categories did not show a clear pattern.

Competition authorities have sometimes been the impetus, in whole or part, for the shift from single-PRO to multiple-PRO governance structures (see Chapter 5). As noted earlier, the German Federal Cartel Office played a key role in shifting the German EPR system for packaging from a single, non-profit PRO to multiple, competing for-profit PROs. More recently, the ARA, the monopoly, non-profit PRO responsible for household packaging waste in Austria, was warned by European Commission that it was abusing its dominant position in the market. The Austrian law governing waste management, already in revision, came into force and a new packaging ordinance with clearer definition of conditions was implemented in 2015, resulting in multiple, competing PROs for household packaging waste (Monier et al., 2014f; Wollman, 2015).

It is difficult to ascertain whether single or multiple PRO systems are preferable. Data are sparse because governance structures for multi-PRO systems as shown in Figure 3.3 often have for-profit PROs which inhibit disclosure of financial and other market information. In Germany, the introduction of competition among packaging PROs led to significant reductions in cost. Some stakeholders argue that the competition led to efficiency and flexibility and thus to the decline in costs. Others argue that the decline reflects primarily competition at the level of collection and processing rather than PRO services (Monier et al., 2014d, 103). Further, as Monier et al. (2014d) point out, there are few cases of real competition, because, where there are multiple PROs, a large PRO usually

dominates. They looked at 8 EPR systems with multiple PROs and found that the market share of the dominant PRO in all cases was at least 48% and in most cases was above 70% (Monier et al., 2014d). In an asnalysis of competition law and EPR under Chapter 3, it is argued that competition should be the norm once EPR systems reach an appropriate level of maturity.

Systems with tradable compliance certifications, such as the United Kingdom packaging system, will tend to be efficient and flexible. Economic efficiency is promoted because those with lowest costs of compliance have an incentive to "over-comply" and sell their surplus certification notes to those with highest costs, reducing average costs. Flexibility arises because actors alter their participation strategy based on the cost of acquiring versus producing the notes.

As noted earlier, the United Kingdom system separates producers from the process of compliance verification. Some criticise this separation because producers are quite removed from the achievement of environmental goals and the meeting of environmental requirements. OECD (2014a) argues that firms are not prevented from putting their own standards in place in order, for example, to maintain reputation. Further, the separation allows regulatory compliance to be focused on a smaller number of (re-processor) firms. In this respect, the virtue – or drawback – of the system is that it does not exploit the business acumen of the producers that some argue is an important element of EPR and that others dismiss as irrelevant.

The United Kingdom system is criticised for its impact on municipalities (Cahill et al., 2011). The system is not designed to cover the full cost of the collection and processing of packaging waste, with coverage typically ranging from 5-10% (Monier et al., 2014c). Because compliance in the system can be achieved by collecting waste packaging from sources other than municipalities, and because municipalities may nonetheless operate recycling programs, they benefit little from the system because few of the funds generated through producer financing are paid to them.

EPR systems where governments play a direct role in collecting and disbursing fees as shown in Figure 3.5 are less common. They can be found in China for WEEE, Chinese Taipei for all products subject to EPR, Denmark and Hungary for packaging and in several US states and in Alberta, Canada. Government control can facilitate the integration of strategies with other waste management objectives. They are also often considered by developing countries contemplating EPR (Manomaivibool, 2009). The absence of industry involvement in the fee collection and disbursement functions however, means that i) societal obligations for waste management have not been shifted to producers ii) any business acumen that producers might bring to those tasks is foregone, and iii) market forces are not exploited as an impetus for efficiency in the EPR system.[39] In addition, the public sector may be in no better position than industry to execute these responsibilities. Nonetheless, generalisations about the effectiveness of governance structures where governments collect and disburse fees as displayed in Figure 3.6 are difficult because many systems are only well documented in the native language of the relevant country, because many are new and lack a track record, and because of especially wide variation in circumstances in the countries adopting this model.

Hickle argues that EPR represents not only an incentive-based policy strategy but also a systematic reframing of the roles of producers and local governments and a transformation of the governance of waste management that can reflect the dynamism of

the global market and deploy technology for enhanced collection, sorting and processing. In that respect, governance structures that maintain a central operation role for government may reflect a transitional stage to a newer, more ambitious strategy.

3.5. Government resources

Considerable attention and analysis in the literature on EPR is paid to costs and fees assigned to producers and incurred by others in the EPR chain – with good reason, as these details go the core of the policy objective and functioning of EPR. However, governance of EPR systems requires action by government agencies – policy formulation and evaluation, data collection and management, accreditation, enforcement, etc. – which, in turn, means that resources for those activities are needed. These activities and the resources they require are separate from traditional waste management services provided by local government. These resources needed for EPR governance include authority, staff, and funds.

EPR systems that are cost-effective lower resource demands insofar as they deliver more social and environmental net benefits than if other, less cost-efficient waste management strategies are pursued. It is worth noting that, when comparing cost-effectiveness across EPR systems, Monier et al. (2014d) found that the most expensive programs were not necessarily the most effective. While measuring cost-effectiveness is crucial for optimal use of resources, its measurement will not necessarily be straight forward and it may or may not make government administration of EPR systems less expensive: it is the cost to society as a whole that is relevant in assessment of cost effectiveness. Nonetheless, the administrative cost per societal benefit delivered (e.g. tonnes recycled) is a key consideration in design of governance systems.

3.5.1. *Authority*

Government agencies charged with the oversight of EPR schemes need sufficient statutory or other legal authority to collect data, establish requirements for, and engage in enforcement regarding entities in the EPR chain. Many EPR systems, as part of the application process for certifying PROs, will require formal agreements between the government agency and the PRO which spell out obligations regarding governance, operations, targets, financial management, and data collection and reporting. The government agency must have the authority to mandate the agreements and to review, revoke, vary, and replace them (Philip Lee, 2014) if effective oversight is to be provided.

3.5.2. *Staff*

No studies documenting staffing levels in government agencies charged with oversight of EPR schemes have been found. It appears that many governments use or expand existing staff in environmental or related agencies to perform these duties.

3.5.3. *Funds*

Funding for government oversight activities related to EPR is also not well documented. It is not uncommon for governments to require payment of a fee by producers at the time of registration and/or payment of fees at the time of certification of PROs (separate from fees paid by producers to PROs). In some cases, the fees are mandated by statute. In California, for example, the Paint Stewardship Law includes provisions for an administrative fee imposed on the producer or PRO to fully cover the cost of administering and enforcing the statute (California Paint Stewardship Law, 2010). The fee is not charged separately, but is part of the

fee paid by producers. The agency charged with overseeing the EPR system, the Department of Resources Recycling and Recovery (CalRecycle), prepares an administrative budget and invoices the PRO for its expenses (Zarrehparvar, 2012).

According to a report prepared by SAIC (SAIC Energy, 2012b), costs[40] to state governments in the US for EPR systems for WEEE as indicated by registration fees ranged from USD .05 to USD 0.28 per pound (lb) collected. For states with higher collection rates, the report indicates that the costs are closer to USD 0.01-0.02/lb collected. It is not clear whether registration fees pay all or only a portion of the governmental costs.

In some EPR systems, funding for what might be labelled ancillary activities – public outreach, waste prevention initiatives, research and development related to DfE, anti-litter campaigns, etc. – is assigned to government agencies (or required of PROs, clearinghouses, or producers).

Fees from enforcement actions imposed upon noncompliant entities in the EPR chain can be additional sources of funds. Reliance on such fees can be problematic to the extent that it creates awkward incentives around enforcement and can be an unpredictable revenue stream.

In some EPR systems, governments use a portion of producer fees as a source of funds to support administrative activities. Chinese Taipei imposes a tax on producers which is then used by the government to develop or subsidise waste services and infrastructure. A portion of the tax revenue is used for the government activities (Ching-Wen, 2004). China currently also imposes a tax on EEE producers but the tax is deliberately set such that the amount collected is less than the amount needed to support collection and processing so that the authorities distribute the funds without retaining any surplus (see Annex D).

3.5.4. Delegation and outsourcing[41]

In many cases, governments reduce their administrative burden – and thus indirectly the cost – by delegating monitoring, co-ordination, and other administrative tasks to quasi- and non-governmental entities. This aspect of delegation is largely distinct from the shift of waste management activities from municipalities to producers.

PROs are typically responsible for arranging for collection and processing services by waste companies and municipalities. As part of that activity, monitoring and reporting are often performed with the statistics then being provided to the government. The extent of the services that are in effect outsourced to PROs by the government agency ranges widely. For example, the PRO dealing with battery recycling in Japan, the Japan Portable Rechargeable Battery Recycling Center (JBRC), monitors the delivery of waste batteries from participating retailers, businesses, and municipalities to those who receive and recycle the batteries and also audits recyclers (see Annex G). In Denmark, by contrast, PROs have a more limited role. The battery (and WEEE) producer responsibility system is controlled by the Ministry of the Environment through a clearinghouse, the Danish Producer Responsibility System (DPA, Dansk Producentansvarssystem) system. The amount of batteries collected is reported to DPA by a combination of producers, PROs, and municipalities. The amount of batteries treated is reported by the waste treatment company directly to DPA (Monier et al., 2014h).

As described earlier, enforcement is generally not outsourced to non-governmental entities because the legal authority typically cannot be delegated. However, other entities in the EPR system can be enlisted formally or informally in the identification of non-compliant participants. In the Czech Republic, the EPR law holds retailers and distributers

responsible for take-back obligations in cases where their supplier does not comply with the packaging law. This has proven to be a very efficient anti-engee riding measure because retailers have strong incentives to ensure that suppliers comply with the law (Monier et al., 2014g). See Box 3.5 for more detail.

Box 3.5. **Delegation of EPR Governance to external organisations**

In Korea, the Korea Environment Corporation (KECO), a public entity established by statute provides oversight for multiple activities in the EPR chain for all products subject to EPR (see Annex J). These include assembling data on sales of products, monitoring and approval of recycling results, and administration of low-interest loans to small and medium-sized recycling businesses. KECO evolved from earlier organisations established by the Korean government. The Korea Resources Recycling Corporation (KORECO) focused on organisational and technological development in 1980s. It was followed by the Korea Environment and Resources Corporation (ENVICO) in 2002 which focused on regulation of the EPR system. In 2008 ENVICO became KECO which added authority for enforcement of design for environment and toxics reduction requirements. This evolution reflected the development of the Korean EPR system. It started as a producer-based deposit refund system in the 1990s arising from a concern about difficulties that might arise from newly granted autonomy for municipalities. It changed to a mandatory EPR system with financial and physical responsibility similar to those in Europe from 2002 onward. In 2008 design for environment incentives were added to EPR systems previously focused on collection and recycling (Chung and Murakami-Suzuki, 2008; Manomaivibool and Hong, 2014).

In some EPR systems, there are additional quasi-governmental and non-governmental entities that play a role in the administration of the system, effectively shifting tasks away from traditional environmental agencies. In Germany, the Chamber of Industry and Trade acts as a data repository for packaging put on the market as required for the Packaging Ordinance. The German Society for Packaging Market Research (Gesellschaft für Verpackungsmarktforschung, GVM), a B2B market research institute specialising on packaging, collects and collates data from across German government agencies as part of the process of verifying the calculation of packaging quantities.

3.6. Observations on patterns and best practice in EPR governance

3.6.1. The difficulties in deducing best practice

As noted in the discussion of allocation of functions in EPR governance systems (§ 3.4.1), there are only limited commonalities across EPR systems regarding the particulars of the involvement of government. Perhaps more important, it is difficult to identify best practices among the patterns that do exist. This reflects the diversity of goals and situations in which EPR systems operate across the globe. It also reflects the conspicuous lack of data and comparative analysis regarding EPR governance. This is compounded by the multiple factors influencing outcomes: with many factors at play, it is difficult to ascribe the performance of an EPR system to a particular governance practice. As Monier et al. (2014d) indicate, there is both a lack of data and lack of harmonisation of data (and practice) across EPR systems. Teasing out causes and effects in governance outcomes requires especially good data. With the vast number of EPR systems in operation around the world, generalisations are precarious.

The boundary between policy and governance is hazy as well. Issues such as which end-of-life products should be included in an EPR scheme – e.g. those from residential waste streams versus those from commercial sources or a few types of WEEE versus an expansive list – are presumably matters of policy design. However, in some EPR systems they are a matter of choice, left to the discretion of producers and PROs. Thus, to whom decision making authority is delegated can be a matter of both governance and policy. It also adds to the list of factors shaping governance choices and outcomes in a particular EPR system along with population density, the historical configuration and maturity of waste management systems, legal structures, and the like. The good news is that the choices are many; the bad news is that analysis is difficult.

Even governance practices that appear to be especially attractive bear careful scrutiny. There is a temptation to look for self-implementing mechanisms that will generate desirable results without extensive government involvement. The most obvious example is the incentives facing producers participating in EPR schemes who are prompted to identify other producers that are free-riding, shirking their obligations. Other mechanisms exist such as making one interest responsible if another fails as when retailers bear the burden of EPR if producers do not meet obligations. These strategies, however, require political will at the time of policy formulation because the interest that is targeted for the assignment of such an additional responsibility will object.

3.6.2. Opportunities for better governance and increased understanding

All is not opaque nor out of reach, however. Much of what appears to be important in this admittedly brief scan of EPR governance practice are basic elements of good governance – clear assignment of roles, systematic monitoring and data collection, transparency, enforcement, stakeholder consultation, adequate resources for oversight. Some of the common features have EPR-specific coloration. Transparency is a particular challenge where for-profit PROs operate, hindering well-informed evaluation of EPR. Enforcement, especially as it relates to entities that collect and process end-of-life products outside of EPR systems, is critical not only for environmental protection, but also for the financial viability of EPR.

Some of the generic gaps in knowledge regarding EPR governance systems can be addressed with moderate investment of time and effort. Many systems have produced reports evaluating performance for use by policy makers within the relevant jurisdiction. These reports contain some of detailed information that can improve understanding of key governance practices. With additional effort, information about practices across EPR systems can be acquired. For example, compilation of registration fees charged to producers could provide some indication of the funds used for government administration.

Some contested issues could be clarified through detailed comparative case studies. Systems with for-profit PROs could be compared to those with non-profits. Similarly, systems with single PROs could be compared with those that have multiple PROs. If the research is to be useful, it would need to go beyond basic descriptions of the EPR systems and simple calculations of the cost per tonne or kilograms per inhabitant collected to engage the specific claims of competing positions and investigate them empirically in depth. For example, non-profit PROs make several specific claims in their criticism of for-profit PROs (see § 3.3.5). Investigation of those particular claims could advance the discussion of for-profit versus non-profit status. Similarly, competing PROs are argued to lower the cost to producers for EPR compliance (see § 3.5.2). Costs could be examined with careful attention to adjustment of data to reflect the differences in the scope and level of service in EPR systems.

Access to data would be a challenge, but nondisclosure agreements and redaction of sensitive information as used in a recent study of EPR in Ireland (RPS et al., 2014) could mitigate this problem.

Comprehensive comparisons of EPR systems, however, will have to wait for better data and increased harmonisation of systems.

3.7. Conclusion

This chapter focuses on the administration and implementation of EPR from the perspective of public authorities. It examines rationale for EPR and the role of government agencies in EPR systems as well as the functions that are assumed by various stakeholders, the differing ways that the delivery of those functions are organised, and how those activities are funded. The primary focus is on activities related to government oversight – monitoring, co-ordination, enforcement, and government resources. The role of municipalities and the legal status of producer responsibility organisations (i.e. non-profit vs. for-profit) are examined as well.

As governments have embraced and implemented EPR, they have found that simple delegation of end-of-life tasks to producers has not been sufficient to achieve policy goals. Along with policy revision in some cases, governance structures have emerged to address the need for monitoring, enforcement, co-ordination, and consultation. Governments in different countries have used a variety of forms of governance for EPR schemes across varying product types. Some aspects of government involvement in EPR systems are a matter of the typical need for government oversight while others are responses to misaligned incentives that have become evident over time.

Four governance structures for EPR are common: single PRO, competing PROs, tradable credits, and government-run. A few key types of organisations are common in EPR systems: government agencies to set, enforce, and evaluate policy and to monitor and certify participants; producer responsibility organisations to organise and manage collection and processing of end-of-life products; clearinghouses to gather data and to allocate service territory; waste management companies and municipalities to provide collection and processing services; and in developing or emerging economies, informal recyclers. Variations on these approaches are many with respect to the type and number of organisations involved and especially with respect to the allocation of specific governance functions to those organisations.

The impact of the legal status of PROs – for-profit vs. non-profit – is widely disputed. For-profit PROs have emerged in EPR systems with competing PROs, particularly for WEEE and packaging in Europe. In other jurisdictions, PROs are, in some cases, required by law to be non-profit. The advantages and disadvantages of for-profit PROs are difficult to disentangle from the effects of the choice of single versus competing PROs.

Governance functions in EPR include policy formulation and evaluation; operations (collection and processing); stakeholder consultation; registration of producers and accreditation of PROs; collection and disbursement of fees; co-ordination of service delivery; monitoring of technical and financial performance of producers, PROs, waste companies, recyclers, and municipalities; and enforcement. Obtaining, verifying and using data on performance and compliance is key element of EPR governance that in many cases needs vast improvement. Increased transparency and harmonisation of data definitions and acquisition practices are central to improvements in cost-effectiveness and to good governance.

Government resources required for oversight of EPR systems include legal authority, staff, and funds. Fees charged for registration of producers appear to be a common source of funding, but little systematic information exists about the resources employed by governments for administrative purposes. Governance functions in some EPR systems are outsourced to non-governmental and non-environmental agencies in diverse ways, reducing resource demands on the central agencies tasked with oversight of EPR.

The role of municipalities in EPR systems is also a matter of contention. The central debates relate to whether and in what manner they should be involved in collection of end-of-life products in EPR systems and especially how the costs are best managed when they do play such a role. "Reference costs" to benchmark or limit costs incurred by municipalities and reimbursed by PROs are increasingly used by EPR systems.

This review of EPR governance belies the notion that EPR is basically a form of privatisation and shedding of responsibility by government. Regulatory authorities have an important role to play and municipalities, in diverse ways, can expand under EPR their waste-related activities as readily as they can shed them. Under EPR some municipalities may collect wastes that were previously not managed. They also may assume a regulatory role in overseeing producer and PRO activities within their jurisdictional boundaries.

Familiar elements of good governance – clear delineation of roles, systematic monitoring and data collection, transparency, enforcement, stakeholder consultation, and adequate resources for oversight – are both crucial and lacking in many EPR systems. Best practices specific to governance of EPR systems are less clear. Commonalities and insights regarding the role of government are both limited and blurred by the multiplicity of factors at play. This review suggests that there is much to be learned about strategies and structures for governance of EPR.

APPENDIX 3.A.1

Defining a positive price for end-of-life products and materials

The presence of products and materials with commercial value in waste streams managed through EPR raises the question of what constitutes a waste with a positive price.

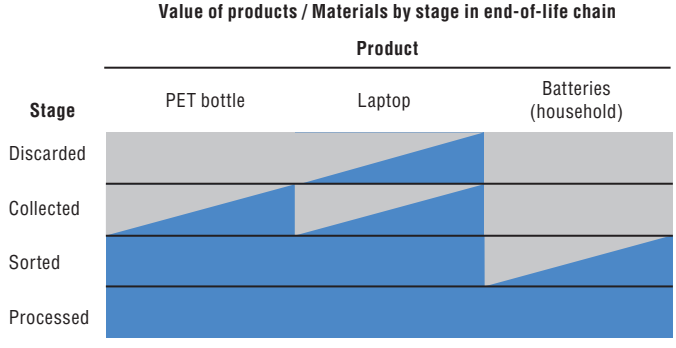
For recycling of a waste to be economically viable without government regulation, subsidy or other form market intervention, the value of the waste must cover the collection, sorting, processing and residue disposal costs. Collection is a particularly important hurdle as it can account for a disproportionate share of the overall cost of recycling.

In discussions of valuable end-of-life products, there is often ambiguity as to whether the price in question includes the cost of collection or whether it simply refers to the price available in the recycling market once the end-of-life products are in the possession of sorters (material recovery facilities), brokers, or processors. Coverage of collection costs is complicated to make into a universal criterion because some end-of-life products are brought to a collection point by households and other waste generators (e.g. WEEE) whereas others are typically collected at the site of discard, as with curb-side collection of packaging waste.

As shown in Table 3.A.1, products and materials vary as to the point in the end-of-life chain when they become valuable.

Table 3.A.1. **Value of end-of-life products and materials by stage in end-of-life chain**

Value of Products/Materials by Stage in End-of-Life Chain



Note: Grey cells indicate negative market values; blue cells indicate positive market values; divided cells indicate mix of negative and positive values depending on condition, components/materials, and markets.

Table 3.A.1 presents positive or negative market values typical of three products often managed through EPR. The table indicates whether used PET bottles, laptops, and batteries (dry cells) from households can be sold for a positive price absent government intervention in the market (e.g. deposit-redemption systems) in OECD countries. In developing countries, where peddlers and scavengers collect end-of-life products, the situation is quite different and not meant to be represented here. In the case of a PET bottle, when a household wishes to discard a used (i.e. empty) container, it is rarely the case that the container can be sold. If collected in a separate stream, the resulting aggregation of bottles in some markets may fetch a positive price (at the front door of the sorting facilities as it were). As part of a mixed stream of recyclables, whether the PET bottles will have a positive market as part of the aggregate is very sensitive to market conditions. Once sorted, washed and then flaked or pelleted, secondary PET can demand anywhere from USD 770 to USD 1 650 per metric tonne.[42]

Unlike the case with PET bottles, a household may have the opportunity to sell a used individual laptop depending on the model, age, and condition. When brought to a collection point and kept separate from other types of WEEE, an unsorted batch of used laptops may either demand a positive price or require payment to be taken by the next actor in the end-of-life system. Once sorted by model, etc., laptops are more likely to have positive value depending on market conditions and model in question. Once dismantled and/or shredded, some components or materials will typically have positive values.

Like PET bottles, used household batteries have no market value for consumers seeking to discard them. Nor do many such batteries have positive value once sorted by type. It is only after processing to separate constituent materials that some of those materials have market value.

Notes

1. The term "EPR systems" is used in this document to refer to the laws, policies, governance structures, and the ensemble of organisations and operations involved in EPR in a given jurisdiction. It includes government agencies, and the EPR chain, i.e. collectors, processors, end use industries, producer responsibility organisations, and clearinghouses. "EPR schemes" is intended to be a narrow term, referring to entities in the EPR chain, especially producer responsibility organisations (PROs).
2. Unless otherwise noted, the term "products" is used in this report to refer to both products and packages subject to EPR regulation.
3. In a very few places, local governments have enacted EPR legislation as described later in this report.
4. The notable exception is a recent study for the European Commission by Bio-Deloitte, *Development of Guidance on Extended Producer Responsibility* (Monier et al. 2014d). It is one of only a handful of efforts to study multiple EPR systems in a detailed and systematic manner. Nonetheless, the study examines only 56 of 169 EPR systems in the European Union and does not include systems in Asia, North America, or developing countries. The research prepared by Monier et al. provides one of the few bases for drawing conclusions across jurisdictions.
5. The term "EPR systems" is used in this document to refer to the laws, policies, governance structures, and the ensemble of organisations and operations involved in EPR in a given jurisdiction. It includes government agencies, and the EPR chain, i.e. collectors, processors, end use industries, producer responsibility organisations, and clearinghouses. "EPR schemes" is intended to be a narrow term, referring to entities in the EPR chain, especially producer responsibility organisations (PROs).
6. Governance is typically defined to include matters of how formal and informal authority are established and exercised. In this report, the focus is on the role of government and the organisational structure and administration of EPR systems.
7. Recyclers may refrain from accepting some EoL products because they do not want incur the cost or regulatory burden of depollution, i.e. removing problematic substances or components.

8. In addition, a variety of other non-environmental market failures can contribute to the inadequate level of recycling and/or the inefficacy of a get-the-prices-right strategy including transactions and search costs in secondary materials markets; information failure and uncertainty related to waste quality; consumption externalities related to products derived from secondary materials; technological externalities related to recovery and reuse of secondary materials and market power; and vertical integration in waste recovery (OECD, 2005b). Analysis has not established a connection, however, between the non-environmental market failures and the specific characteristics of EPR as a remedy for those failures with the exception of technological externalities (Nicolli et al., 2012).
9. Note that there are many anecdotal accounts of DfE in response to EPR. What is missing are systematic evaluations at the national or sectoral level using methodologies that can distinguish the impact of EPR on DfE from other factors that may also motivate design changes. For an example of potential design changes that can be tied to EPR, see Klausner et al. (1998) and Lindhqvist and Lifset (1998). Tojo (Tojo 2004) in a detailed study of Japanese EPR for home appliances argues the close relationship between producers and recyclers prompted by EPR has encouraged DfE. See Box 2.1 for a description of the Japanese Specified Home Appliance Law.
10. This characterisation leaves aside the fact that recycling is in fact an intermediate objective, pursued to achieve reductions in a variety of environmental impacts up and down the product chain. These reductions can in turn be seen as means of accomplishing other, broader societal goals, e.g., improved human health, conservation of habitats and ecosystems, protection of economic assets, etc.
11. A positive price for an EoL product or material does not necessarily mean that there is no market failure if the level of recycling that occurs is less than optimal. Analogously, a negative price does not necessarily indicate market failure if the appropriate level of recycling is occurring.
12. The CWIT report emphasizes that "there is a varying degree of compliance and criminality that spans across a continuum ranging from minor unintentional violations or non-compliance by individuals to deliberate illegal activities following a criminal business model." Using the statistics, "unreported" export thus includes both more benign and more problematic forms of export (Huisman et al., 2015, 24)
13. "Jurisdictions" is used in this report so as to include local governments, states, provinces, national governments and supra-national governments, because the use of EPR is not limited to the national level.
14. The term "producers" throughout this report encompasses distributors, retailers, and importers where EPR laws mandate their participation, unless otherwise noted.
15. Individual producer responsibility can include both systems operated by individual producers and systems where producers share operational responsibility but remain individually responsible on a financial basis (Dempsey et al. 2010; Mayers et al. 2013).
16. The term "shared responsibility" has varied meanings in the context of EPR. With regard to the role of municipalities, it indicates that they share some degree of administrative or operational responsibility as indicated above. In the United Kingdom, it refers to the division of responsibility among actors in the supply chain (see discussion below on tradable credit systems). In the US, "shared product responsibility" was advocated by industries opposed to the establishment of EPR obligations (Lindhqvist and Lifset 1997).
17. Beverage container deposit systems also constitute competition for packaging PROs, albeit competition for inputs rather than for customers.
18. Some describe the United Kingdom EPR system for WEEE as a tradable credit system but it differs in subtle, but in important ways from the United Kingdom system for packaging, in part with respect to the transparency of the pricing. For more detail, see (Smith 2014).
19. *www.gov.uk/government/policies/reducing-and-managing-waste/supporting-pages/packaging-waste-producer-responsibility-regimes*.
20. The term product stewardship is used in different ways across countries and stakeholder groups. In the US, in the 1980s and 1990s, it was often used to refer to programs in the chemical industry focused on the management of potentially toxic substances and products (e.g., the Responsible Care program), often not extending to consumer use and disposal. More recently, in the US, environmental advocacy groups involved in EPR, have defined product stewardship as a policy where producers bear primary responsibility for health and environmental impacts across the product life cycle. In this view, EPR is a subset of product stewardship focusing on producer responsibility for end-of-life management of product and packaging (Upstream et al. 2012). In Canada, product stewardship refers to programs that typically allocate responsibility to municipalities or provincial governments using legislated fees or public funding.

21. CONAI (Italy), EcoEmbes (Spain), Ecopack (Bulgaria), ECO-ROM Ambalaje (Romania), EKO-KOM (Czech Republic), Envipak (Slovakia), Fost Plus (Belgium), Green Dot Cyprus, Greenpak (Malta), Nedvang (the Netherlands) and Valorlux (Luxembourg).

22. The arguments against for-profit PROs were only one of several topics addressed in the Manifesto.

23. A detailed and useful discussion of for- versus non-profit PROs in the Irish context, however, is provided by Gorecki (2014).

24. Case C-41/90 Höfner & Elser v Macrotron [1991] ECR I-1979 ("Höfner & Elser"), paragraph 21, cited in United Kingdom Office of Fair Trading (2011).

    Although, for example non-profit entities may have differing objectives, at the margin they have an interest in exploiting any ability they may have to raise prices because they use the profits thereby generated to fund their objectives. (Philipson and Posner, 2009) A review of the literature on non-profit, privately-owned hospitals in the United States found that there was no economic theory to support the presumption that non-profits will not exercise market power to the detriment of total or consumer welfare. The empirical literature showed that nearly all of them exercised market power by raising prices. (Dravone et al., 2012)

25. For information on the e-waste take-back law in New York City, subsequently repealed, see Cardwell and DePalma (2008). For Alameda County, California's pharmaceutical take-back ordinance, see Almeda County Public Health (n. d.). For the pharmaceutical take-back ordinance in King Country, Washington, see King County and Seattle Public Health (2013).

26. For the purposes of this report, it is not important to distinguish between various forms of and terms for local government. Many labels for local governments refer to cities (e.g., municipalities, councils, local authorities) while others refer to a level of government between cities and states or provinces (e.g., county). The important distinction in this context is between levels of government that usually formulate or enforce policy (states/provinces and national governments) and those that deliver services (local governments).

27. While technically packaging in France is managed by two PROs, the main shareholder of the second PRO is the first PRO, so it may be viewed as a single-PRO system.

28. In those EPR systems that allocate responsibility on the basis of "return share," that is, the proportion of a producer's goods among those collected for recycling, the relevant data are collected by PROs or clearinghouses rather than registries. Other systems allocate responsibility on the basis of waste generated using a "put on the market" calculation where sales data are adjusted to reflect product life spans. This is especially the case for long-lived durables where sales do not correlate with discards on an annual basis. For a discussion of calculation methods for this last approach in the context of the Canadian province of Ontario, see Waste Diversion Ontario (2010).

29. While ARMA is a nonprofit organization and is run by a Board of Directors representing stakeholder groups, because it reports to the Ministry of Environment it is viewed in Canada as a government agency (Alberta Recycling Management Authority 2015; Lange 2015; Kerr 2015).

30. Producers have the option of not submitting a plan and instead may choose to follow specific requirements detailed in the regulations.

31. Stewardship plans are prepared and submitted by PROs on behalf of participating producers and thus the legal obligation falls on the producer and the wording reflects that.

32. Under the Home Appliance Recycling Law, Japanese consumers pay a fee which is intended to support collection and transport of home appliances. The amount of the fee is displayed at the time of purchase, but collected at the time of discard (Hotta et al., 2014).

33. Mass balancing involves calculating inputs and outputs (plus changes in stocks) across facilities in the EPR chain. If the totals do not match, this is an indication that there are errors or gaps in the data (Kleijn 1999).

34. The amount of free riding can be substantial: In Germany, it is estimated that about 25-30% of the packaging collected through the EPR system from households is not covered by license fees from producers (Monier et al., 2014i). In some instances the free-riding reflects or is exacerbated by ambiguities in the laws or regulations governing EPR.

35. At the time of the preparation of this report, the summary of the study, *Countering WWEEE Illegal Trade (CWIT)*, had just been issued, though the detailed substance of the report was still in the process of review. Because the CWIT study addressed WEEE in the European Union and because WEEE in the EU is managed through EPR, the study implicitly addresses enforcement related to

EPR. Information from the summary has been included here, but the full study is likely to contain additional information relevant to enforcement of EPR-related laws and regulations.

36. The notable exception is Dual System Deutschland (DSD) in Germany.

37. *www.rijksoverheid.nl/documenten-en-publicaties/rapporten/2013/09/02/basisdocument-monitoring-verpakkingen.html*.

38. Producers, for example, filed a law suit against the City of New York City when the city proposed door-to-door collection of WEEE under the City's newly enacted waste electronics law (Gronewold 2010).

39. It is important to note that there are 3 types of competition in EPR systems: among PROs, among providers of collection, sorting and treatment services, and among end markets for secondary materials. The absence of competition among PROs does not preclude competition in other parts of the EPR system (Gorecki 2014).

40. Data are mostly for 2010 but 2009 and 2011 data are also used.

41. Delegation implies a shift of decision making in addition to administrative functions. Outsourcing, most frequently used in business contexts, suggests hiring of an external entity on a contractual basis to perform activities in which the contractor has more expertise. The distinction in this context is not significant.

42. These are approximate prices in the US in 2014 (Dimino 2015). It should be noted that transportation distances have a significant impact on the market value of recyclables. For instance, in Chile, which spans 4 000 km from North to South and has most recycling facilities in the centre, transportation costs can be significant.

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