

# Complying with Extended Producer Responsibility Requirements: Business Impacts, Tools and Strategies

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**Abstract - As electronic product take-back requirements and materials restrictions spread throughout the EU, Asia and North America, multi-national companies must adapt by improving due diligence programs and incorporating compliance steps into supply chain management systems. This paper will first review the regulatory background of requirements that manufacturers and importers of electronic goods are (and will be) required to meet. Secondly, examples of how these extended producer responsibility (EPR) requirements are impacting businesses will be provided. Finally, the paper will introduce tools and management strategies that are available to minimize costs of compliance.**

**Keywords: product stewardship; environmental product regulations; extended producer responsibility; compliance**

## I. LEGISLATING A SOLUTION

Most extended producer responsibility (EPR) legislation contains a preamble that outlines the growing quantity of electronic waste produced annually and an explanation of the hazardous materials contained within this equipment. By placing waste management responsibilities and design requirements on electronic product producers, this type of legislation aims to secure funding for electronic waste, reduce the amount of electronic product waste, and reduce hazardous materials contained in this equipment.

EPR has been used as a policy approach to address environmental problems associated with many product types, such as vehicles, electronic products, batteries, and packaging. Currently, 12 countries legislate producer responsibility for electronics; many countries regulate batteries, including 16 that require producer responsibility; over 30 countries mandate producer responsibility for packaging. These producer responsibility regulations have long been established in countries overseas, but are now appearing in N. America. The number of countries enacting such legislation, as well as the stringency of the existing regulations, is ever increasing.

EPR legislation is beginning to significantly affect cost of goods, product design and the information that companies share. This paper aims to first, briefly outline the legislative landscape, then to describe the impacts of this legislation on businesses, and finally to propose tools and strategies for businesses to manage compliance with these requirements.

## II. OVERVIEW OF EPR REGULATIONS

EPR legislation generally is composed of three basic elements: waste management financing; product design; and informational requirements.

### A. Waste Management Financing

EPR regulations, such as the EU WEEE (waste electrical and electronic equipment) Directive<sup>1</sup>, transfer the obligation of waste management for electronics, battery and packaging waste from the government to the producer. (Please note that, in this paper, 'producer' is understood to mean the in-country manufacturer or importer of a finished good.) Legislation generally gives producers two options for managing product waste. Producers can either:

- Comply individually (i.e., set up its own system for the collection, sorting, recycling and recovery of all his own product waste, or
- Comply collectively (i.e., join an organization that assumes responsibility for collecting and processing their post-consumer packaging waste.)

The latter option is the choice that makes the most economic sense for the majority of producers. Collective compliance usually requires the producer to submit detailed product sales reports to the organization so that fees can be assessed for managing end-of-life product waste.

Fees are most often based on electronic product type or by the weight of the product. The rates of the fees are based on the cost of waste management (i.e., collection, sorting, recycling, reuse, etc.). Waste compliance organizations usually function within country boundaries, each with a unique set of rules (e.g., reporting, fee structure). Examples include Recupel in Belgium, SCRELEC in France, El-Kretsen in Sweden and Elektronikkretur in Norway. Electronics producers must also take responsibility for battery and packaging waste associated with their products.

### B. Design Requirements

EPR legislation includes design requirements that regulate both material restrictions and design for recycling and/or reuse.

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<sup>1</sup> Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment, as amended. *Official Journal L 037, 13/02/2003 P. 0024 – 0039.*

1) *Material restrictions:* Some countries have already enacted legislation that restricts heavy metals and other hazardous substances in electronic products. The EU RoHS (restriction on hazardous substances) Directive<sup>2</sup> will further restrict the use of mercury, lead, cadmium, hexavalent chromium, and certain brominated flame retardants used in electronic equipment. The directive stipulates that these substances are banned from use in regulated electronic products as of July 1, 2006. Exemptions exist for certain applications. Furthermore, heavy metals limitations must also be respected in any associated batteries and packaging.

2) *Design for recycling/reuse:* The EU WEEE Directive requires Member States to meet targets for recycling and/or reuse. Member States have the authority to require producers to design products such that these targets are met by each product placed on the market. (As of January 2004, the EU Member States have taken different positions as to whether they will hold producers directly responsible for meeting these targets on a product basis or whether they will use samples or protocol-based approaches instead [1].) In addition, the EU WEEE Directive prohibits designs which impede reuse.

### C. Information and Labeling

Some EPR laws require the producer to provide the recycler with information regarding the location of hazardous substances that must be removed during treatment. This requirement enables proper treatment of such substances so as to eliminate/reduce environmental harm at end-of-life. The EU WEEE Directive stipulates that producers make information available in a digital format (e.g., CD).

EPR legislation often includes a requirement to label the product, user manual, and/or packaging to inform the consumer that s/he should not place the product in the trash, but rather drop off the product at designated collection locations for separate disposal. Depending on the country legislation, this requirement could be met by providing information in the product's user manual, on a web-site or via a toll-free phone number. Once the WEEE Directive passes, any electronic good that could fit in a trash receptacle must be labeled with the "Crossed-out Wheelie Bin".

## III. HOW EPR IMPACTS BUSINESS

EPR regulations are impacting businesses on several fronts: cost of goods are affected by end-of-life waste fees; product design assessment is affected by design requirements; management is affected by the need to maintain new data points, communicate with the supply chain, and track client requirements.

<sup>2</sup> Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment. Official Journal L 037, 13/02/2003 P. 0019 – 0023.

### A. Waste Management Fees

The waste fees that EPR regulations make producers liable for add up. The three tables below breakdown waste fees assessed for various electronic product types, their associated batteries, and packaging.

1) *Electronics waste fees:* Amongst the waste compliance organizations, waste fees by product vary significantly. For example, Table I (below) shows the waste fees charged for a laptop computer, camera and a printer by waste compliance organizations in Belgium, Switzerland and Taiwan. The table shows that the fees charged for a laptop are highest in Switzerland at \$11.22 per unit compared to Belgium's fee of \$2.51 and Taiwan's fee of \$1.15. However, comparing the fees for a digital camera shows that Belgium's fee of \$7.54 is highest, whereas Switzerland's fee is just \$1.59 per unit (Note that Taiwan's EPR scope does not include cameras).

TABLE I. COMPARISON OF ELECTRONIC PRODUCT WASTE FEES AMONGST WASTE COMPLIANCE ORGANIZATIONS

Product Type	Fee (in USD/ unit)*		
	Recupel (Belgium)	SWICO (Switzerland)	Taiwan EPA (Taiwan)
Laptop computer	\$2.51	\$11.22	\$1.15
Camera (digital)	\$7.54	\$1.59	N/A
Printer	\$2.51	\$7.95	\$4.02

\*Please note that this table is only for the sake of broad comparisons; fees may vary based on the specific product.

1 EUR = 1.242 USD; 1 TWD = 0.302 USD

In the nine (9) countries that currently have producer responsibility requirements for electronic waste, most countries determine fees by product type (per unit basis) or by weight of the product. However, others calculate fees by retail value, by market share, or by the actual market cost of recycling. The U.S. state of California will assess fees based on screen size. According to a weight-basis fee calculation, a product that weighs less will incur a lower fee. However, for programs that assess fees based on product type, the producer will incur the same fee regardless of the weight of the product. Thus, the schemes do not have consistent financial incentives for businesses.

2) *Battery waste fees:* Consider the laptop computer in Table I (above). This laptop contains a rechargeable lithium battery that weighs 3.28 kg. Table II (below) shows the fees that a producer would be assessed to fund waste management of the battery in Belgium, Switzerland and Taiwan.

TABLE II. COMPARISON OF BATTERY WASTE FEES AMONGST WASTE COMPLIANCE ORGANIZATIONS

Country/ Organization	Fee (in USD/ unit)
France/ SCRELEC	\$7.13
Portugal /Ecopilhas	\$4.24
Slovakia/ Recycling Fund	\$0.81

1 EUR = 1.242 USD; 1 SKK = 0.031 USD

3) *Packaging Waste Fees:* Again, taking the example of the laptop computer, the producer will also be liable for

paying packaging fees for managing the costs of managing packaging waste. Table III (below) shows the fees that are associated with the packaging of a laptop in Canada, Germany and France.

TABLE III. COMPARISON OF PACKAGING WASTE FEES AMONGST WASTE COMPLIANCE ORGANIZATIONS

Country/ Organization	Fee (in USD/ unit)*
Canada/ Stewardship Ontario	\$0.049
France/ Eco-Emballages	\$0.244
Germany/ DSD	\$0.267

\*Fees are based on an actual packaging system for a laptop computer; fees will vary due to differences in packaging systems.

1 EUR = 1.242 USD; 1CAD = 0.748 USD

The waste fees mentioned above are calculated on the basis of reports submitted to waste compliance organizations.

### B. Product Design

In order to comply with both material restrictions and potential recycling/reuse design requirements, electronic products must be reviewed on the component level to ensure that the entire product complies with requirements. In order to comply with the material restrictions, producers will have to ensure that component specifications are written so as to forbid regulated materials and to obtain certifications from the supply chain. If Member States require producers to design products that meet the recycling/reuse targets, product designers will need to consider how to improve recyclability, for example, by either eliminating coatings or ensuring that any coatings are compatible with the substrate.

### C. Data Requirements

EPR laws require companies to submit reports on waste generation and product material contents. To enable reports generation, producers must maintain a set of data points that are not necessarily consistent across countries. Moreover, there are many necessary data points that companies have not previously needed to maintain (e.g., battery chemistry and weight; product and packaging weight by component). Producers must maintain this data on the component level in an electronically accessible format. Thus, businesses will be required to make new expenditures to collect and maintain this data in a bill of materials database.

Cost-effective compliance with these regulations requires setting up management systems to obtain and communicate the necessary data. Since electronic components are sourced from a myriad of suppliers, intimate knowledge of product components and certification documentation comes only through integrated supply chain management.

### D. Supply Chain Management Learning Curve

In response to these EPR laws, major multinational companies have implemented involved supplier requirements, in an effort to ensure compliance. Sony is a prime example.

In November 2001, Sony was cited for non-compliance with material restriction legislation when attempting to import PlayStation One (PS1) game consoles into the

Netherlands. Since the wiring for the product exceeded legislated limits of cadmium, 1.3 million units were denied importation. This compliance action caused Sony to rethink its supply chain management.

In April 2003, Sony implemented what it calls its "Green Partner Program", a supplier approval program. The program will only approve those suppliers that demonstrate comprehensive environmental compliance and pass an environmental audit by Sony. The program stresses reduction and elimination of environmental-related substances as listed in Sony documentation.

Teruo Masaki, Senior Executive VP and Group General Counsel for Sony shared its supply chain management experience with participants of a US conference in November 2003.<sup>3</sup> The program reduced Sony's supply chain by about one-third. The total cost to Sony for the PS1 remediation and compliance exercise was \$130 million. Sony incurs annual costs of \$3 million to maintain the program. Note that these costs do not include the costs incurred by suppliers.

### E. Client Requirements: Beyond Compliance

Striving to prove good corporate citizenship, Sony and other businesses that purchase electronics components, such as Ford Motor Company, are going one step beyond regulatory compliance and requiring their suppliers to follow suit. For example, Ford requires its suppliers, in addition to the reporting restricted substances, to report the amount of recycled content in product components.

Many potential suppliers to such companies may track regulatory requirements, but a growing challenge now is to track additional client requirements, communicate them to the responsible parties and successfully implement them. Respecting client requirements may entail maintaining data points beyond those which are required by law, such as recycled content. Furthermore, despite some efforts to harmonize reporting formats (see section below) clients may also still request unique reporting formats.

## IV. COMPLIANCE TOOLS FOR BUSINESS

The challenge for multinationals is to comply with the myriad of regulations across the globe. There are several tools available to companies to assist them with complying. A few are listed below.

### A. Material Composition Declaration Guide

Realizing that supply chains for electronic products are on a worldwide scale, three electronics trade associations [EIA (Electronic Industries Alliance, U.S.), EICTA (European Information & Communications Technology Industry Association, EU) and JGPSSI (Japanese Green Procurement Survey Standardization Initiative, Japan)] collaborated to develop a harmonized format for reporting material composition.

<sup>3</sup> Business for Social Responsibility 2003 Conference

The Material Composition Declaration Guide aims to facilitate and improve data transfer along the entire global supply chain. It is only to be used for materials and/or substances contained in or making up parts and subparts used to produce an end-use product. The Declaration Guide identifies two categories of substances/materials of interest: those subject to current regulations; others deemed by industry as important to report (e.g., precious metals, potential for negative impact at end-of-life).

The guide lists a specific set of data fields that should be reported. Included in the guide are legal citations for material/substance restrictions as well as a detailed chemical list with CAS-numbers that are to be reported.

#### *B. Pack.NET*

Developed by Foresite Systems, Limited in the UK and marketed by EPI in North America, this compliance software tool aids companies in complying with all extended producer responsibility requirements including electronic products, batteries and packaging. This tool calculates waste fees and generates compliance reports for all worldwide electronics, battery and packaging regulations. The tool can store specification documentation, as well as build and maintain material composition documentation for RoHS compliance certification.

Pack.NET is able to act as a stand-alone database or read data from wherever it already exists (e.g., purchase ledger, etc.) and is Internet browser-based using the MS.NET platform. This Internet-based software tool can save the producer valuable human resources in many ways. For example, suppliers can input component data directly into the company database. Also, the tool provides worldwide access to data for regulatory needs (e.g., reporting). Another valuable function of the tool is that it is capable of being used as a design tool. For example, designers can input the product specifications into the software, and then assess how end-of-life fees would be affected if components were light-weighted.

#### *C. Due Diligence Protocol*

Establishing and carrying out a due diligence protocol is important to ensuring compliance. This protocol exists to make sure that all procedures established to enable compliance are, in fact, being respected. The following are key aspects of a due diligence protocol.

- Producers of electronics goods should require suppliers to maintain documentation certifying compliance with relevant standards or, in addition, the producer's own set of global standards.
- The producer should also require that the supplier component certification testing be done by an independent laboratory.
- The producer should perform random materials testing to ensure that the components in fact meet the materials requirements.

- The producer should conduct internal audits to ensure that EPR-related protocols are followed.

#### V. HOW TO PREPARE FOR FUTURE REQUIREMENTS?

How do producers and importers of electronic goods and suppliers of electronics components cope with these extended producer responsibility mandates? Below are a few basic steps to aid all companies with a stake in electronic goods.

##### *A. Understand the Requirements*

Producers of electronic goods must understand the requirements in the markets in which their products are sold in order to avoid bad press, fines and the possibility of their products being banned from the market. Furthermore, since differences exist between country EPR requirements, companies should understand in which jurisdiction requirements exist for their products. Understanding the waste fees would benefit the producer of electronic goods twofold: the producer could design products that would incur lower fees; and include the waste fees in the cost of the product sold. Suppliers who understand these EPR requirements could create a marketing advantage over those who do not.

##### *B. Incorporate Waste Fees into the Cost of the Product*

There are many fees that producers are now required to pay to fund their product's disposal/recycling at end-of-life. Waste fees associated with EPR legislation are real costs. In order to adequately address these fees, they should be given appropriate management visibility, considered during the design phase and included in the overall cost of goods.

##### *C. Maintain Necessary Data Points*

These extended responsibility mandates place new data demands on the average producer of electronic goods. In order to be able to generate reports for electronics, battery and packaging waste fee payments and maintain documentation on material composition, the producer of electronic goods must maintain data on, for example, weight, detailed material composition, and component type. This level of detailed data is not normally stored in the average bills of materials. Thus, a producer of electronic goods should add the necessary data points to its database. Furthermore, reports to waste compliance organizations are subject to audit, necessitating detailed information.

##### *D. Integrate EPR Issues into the Product Design Protocol*

Many departments, such as product designers, component purchasers, international affiliates and the legal staff, have responsibilities to ensure compliance with these EPR mandates and also, any specific client requirements. Integrating EPR issues into a product design protocol is important to ensure that each compliance aspect is addressed. Throughout the protocol, documentation should be maintained to certify compliance. Companies purchasing finished products should require their suppliers to conduct the same product design protocol.

## CONCLUSION

EPR mandates are expanding across the globe and increasing in stringency. These mandates demand that producers of electronic goods take a closer look at the way electronic products are designed, from the material content to the component design. These requirements will force producers of electronic goods, who are legally responsible for compliance with these mandates, to better communicate with their supplier chain. Understanding the requirements

and their impact is important for businesses that have a stake in electronic products to adapt to new market realities.

## REFERENCES

- [1] Unofficial note of Technical Adaptation Committee Workshop on the WEEE & ROHS Directives; 24 October 2003; London, Department of Trade and Industry website <http://www.dti.gov.uk/sustainability/weee/weeetac.pdf>