New environmental legislation, which is being introduced around the world at an ever increasing rate, can catch even the smartest companies off guard. In 2001, just before the Christmas rush, Dutch customs officials confiscated 1.3 million Sony PlayStations and accessory packs worth over 180 million euros. Inspectors had discovered that the consoles and packs were bundled with cables that contained more cadmium than permitted under E.U. laws. This oversight cost Sony millions of dollars, and delayed its shipments during a peak selling season.

Examples like this should serve as a wake-up call for all companies. As the sustainability agenda ratchets up, companies around the world are facing mounting pressure to comply with environmental protection laws. As laws become more numerous and strict, their impact on costs becomes greater. Firms may need to rethink their business operations in order to maximize profitability and avoid unpleasant surprises.

Coming Soon to a Business Near You
One area of legislation that is likely to have an important effect on firms is Extended Producer Responsibility (EPR), which is designed to hold manufacturers responsible for the environmentally safe disposal of products. Although this applies primarily to the electronics industry, EPR laws are turning up in the context of packaging, chemicals and end-of-life vehicle recycling.

Several factors are currently driving the mo-
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SUSTAINABILITY: BRINGING LIFE TO YOUR BUSINESS

mentum of these so-called take-back laws. First is the sheer quantity of global consumption. Sales of electronic products – from cell phones to computers – have skyrocketed in recent years. Considering that Americans alone discard 340,000 cell phones every day, according to the California Product Stewardship Council, the environmental impact of electronic waste, or e-waste, generated by cast-off computers and redundant mobile devices is a growing cause for concern.

Another issue fueling legislation is shrinking product life span. The constant pressure on companies to churn out new product innovations means that the average life span of many electronic goods has shrunk dramatically. In developed countries, the average time that people hold onto a laptop before they upgrade it is around two years; even less for cell phones.

While firms have made strides in reducing the hazardous materials used in the manufacture of their products, regulators remain on high alert. Electronics contain toxic substances such as lead, mercury and cadmium – and an estimated 40 percent of these heavy metals found in landfills can be traced to e-waste.

The call for greater e-waste management is coming from several fronts. Governments, obviously, have a public duty to minimize the negative social and environmental impact of these potentially harmful goods. NGOs and civic-minded activists are also lobbying hard, and the rise of social media ensures that their messages go viral.

As diverse environmental legislation is being formulated around the world, companies may find themselves in a “gray zone,” as the authors explain in a new paper on the subject. This presents challenges but also opportunities for companies to clarify operations in four areas: forming a network, rethinking product design, setting up a closed-loop supply chain, and adopting new technologies and business models. The authors believe that individual producer responsibility, based on the share of electronic waste, or e-waste, each party generates for recycling, may bring the greatest long-term advantages. Even better would be to have incentives that extend product life cycles and prevent e-waste to begin with. But the onus is on companies to make this case with policy makers, which requires them to seize hold of the sustainability agenda.

Given all this, the take-back trend is something that companies cannot afford to ignore, relegate or treat in a superficial manner. A few exceptional companies have anticipated the coming legislative wave and have managed to mitigate its effects on their operations by taking a proactive approach, which we will look at in this article.

The Gray Zone
Based on our research paper, we have identified a “gray zone” between two macro-level perspectives, with all the various legislative instruments at one end, and the subsequent economic outcomes at the other.

The “gray zone” represents the space between these two poles where crucial decisions are made that will affect a business (see Figure 1). The implementation choices and the producer choices will undoubtedly have an impact on different stakeholders in society, though how and to what extent are areas that lie beyond the scope of this article.

What’s certain is that, as public concern about sustainability intensifies, smart companies will be those that get a firm grip on the issues that could affect them – particularly multinationals, since they are most sensitive to operational constraints that vary from country to country.

Global Approaches
Governments around the world take different approaches. Since take-back laws can have a major impact on operations, competition, product design and supply-chain management choices, it is vital for companies to understand the take-back laws currently in effect and those on the horizon.

Europe: Collective Systems Prevail
In Europe, one of the most influential laws driving new take-back legislation is the Waste Electrical and Electronic Equipment (WEEE) Directive. Enacted in 2003, it covers all E.U. member states, and promotes collection and recycling in five product categories: cooling and freezing appliances; televisions and monitors; large household appliances; small household appliances; and lighting equipment.

Under the WEEE Directive, manufacturers must provide a way for consumers to return e-waste free of charge in order to meet specific
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The directive can pose significant challenges for companies, because it does not specify exactly how its goals should be met. Consequently, policy makers have implemented vastly different laws across the eurozone.

Collective systems – where producers jointly finance the recycling of e-waste and pay on the basis of market share – are generally favored in Europe. Nevertheless, differences within this approach can have important effects on company operations. In the United Kingdom and Germany, for example, producers can create their own collection systems for generated e-waste; this is prohibited in Belgium and France, where producers must use local municipal collection points or retailers. In the U.K., Germany, France and Ireland, competitive systems are permitted, whereas Belgium takes a monopolistic, state-run approach.

It is worth noting that Sweden has enacted environmental legislation on a national level that seeks to induce green design improvements. Car manufacturers, for example, pay insurance premiums to a private insurance company to cover the costs of future recycling. Premium rates are tied to estimates of future recycling costs. This unique approach has two key benefits: it reduces the uncertainty of future recycling costs, while at the same time creating incentives for environmentally superior design.

United States: A Mixed Bag

In the United States, there is no take-back legislation in place at the federal level, but individual states have started to formulate their own laws. Since 2004, 22 of the 50 states have passed e-waste bills that mandate producer responsibility. Most went into effect in 2009. The remaining states are expected to follow suit. On the whole, the United States seems to be moving toward producer responsibility, with the notable exception being California, where consumers pay for recycling costs. Compared with Europe and Japan, U.S. take-back laws seem to allow greater flexibility. Some state governments, however, appear to favor the European model, in which collective producer responsibility is favored, and it is the producers who must pay the average collection and recycling costs per volume of e-waste.

One important transatlantic difference is that producers in the United States typically share costs based on return shares, while in Europe, cost-allocation models are mostly based on market share. In return-share models, producers do not pay based on their sales volume, but on their volume of product collected. This difference might seem trivial, but can be very important, since companies with lower return volumes do not want to share costs with firms with higher return volumes.

The Gray Zone

The way policy is implemented will affect the four key decisions that producers will have to face.

**Implementation Choices**
- Which type of scheme?
- Who's responsible?
- Who bears the greater burden?
- How will costs be shared?
- What incentives?

**Producer Choices**
1. Network Approach
2. Product Design
3. Closed-Loop Model
4. Technologies & Business Models

**Responses of Stakeholders**
- Consumers
- Collectors
- Recyclers
- Municipalities
- Environment

**Figure 1**

The way policy is implemented will affect the four key decisions that producers will have to face.
Asia: Producer Responsibility
Japan has one of the most comprehensive sets of take-back laws based on individual producer responsibility. Both producers and consumers are responsible for the costs of appliance recycling, and operational responsibility falls on producers. Retailers serve as collection points for appliances and the national postal network for computers. In 2010, China approved a federal plan, which will be paid for by producers and run by the government, starting in 2011.

The Policy Perspective
As take-back laws have evolved, various policy tools have been employed to meet their objectives.

- Collecting recycling fees in advance at the moment of purchase.
- Unit-based fee approach, which charges the end user when an item is thrown away.
- Recycling subsidies, paid by governments to firms that recycle, although this requires significant governmental planning.
- Deposit/refund system, in which a tax on production and/or consumption is linked to a subsidy proportional to product recycling. Some consider this to be the least costly and most favorable option.
- Recycling targets, which define the specific quantity or percentage of products sold that have to be recycled.

Generally speaking, there are two types of e-waste management systems. In collective systems, e-waste from producers is combined, and the total cost of recycling is divided among producers in ways that can put some firms at a disadvantage. For example, some E.U. countries require producers to participate in collective schemes in which companies must pay fees based on their share of the market, regardless of the volume of e-waste produced.

Some manufacturing companies have started to complain about this type of system. Tying market share to how much a company pays for potential waste is not always logical. Computer monitors, on the one hand, are costly to recycle, while recovered cell phones, on the other hand, can actually generate additional profits. Forcing the cell phone manufacturer to share the recycling costs of the monitor manufacturer seems unfair.

Collective schemes can also encourage free riders – those who benefit from EPR systems, without contributing their fair share of the costs. Some companies have started lobbying against collective systems and pushing for a focus on individual producer responsibility.

Under individual producer responsibility-based models, which require producers to bear only the recycling costs of their own products, producers seem to have the greatest long-term advantages. They create incentives for superior green design, and also reduce recycling costs for municipalities. This approach is in keeping with the original spirit of the WEEE Directive, which states that manufacturers should only be held accountable for their own waste.

Apart from these policy tools and e-waste management systems, several other factors affect the implementation of take-back laws.

- How is the collection network set up?
- Who undertakes collection and recycling operations: regulators or manufacturers?
- Who has the greatest financial obligation: the end user, the buyer or the manufacturer?
- How are costs shared among manufacturers in collective systems?
- How are fees and targets established, and what incentives for green design are in place?

Four Producer Responses
It is imperative that companies are aware of all policy factors and that they understand the eco-
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Economic impact that take-back laws may have on their businesses, so that they can manage them as efficiently as possible. Simply from a cost perspective, if the compliance costs of e-waste legislation amounts to just 1 to 3 percent of a firm’s profits, then a business - especially one already operating with slim margins, as many are during these leaner economic times - could be significantly impacted. Here are four key issues to consider.

1. Network Approach: Strength in Numbers
Take-back laws may require companies to set up infrastructures for product collection and recycling. The costs and implications of doing this must be carefully analyzed. In some cases, collaborations with other firms may permit optimal infrastructures.

A good model is the European Recycling Platform (ERP), which was founded by four leading manufacturers – Procter & Gamble/Braun, Electrolux, Hewlett-Packard and Sony – in anticipation of the Weee Directive. According to the ERP website (www.erp-recycling.org), these companies wanted to strike first, so that, in fulfilling their legal obligations under WEEE, they could make sure they stayed as competitive as possible, while also being ecologically efficient.

This cooperative agreement is their answer to state-operated schemes, based on a common vision of “individual producer responsibility, the need for competition in the WEEE services market, and a desire for market-based structures that reward improved design for recycling.”

The ERP is designed as a horizontal compliance scheme. It covers all WEEE categories, along with bulbs and lamps, and even batteries. It insists that member companies taking part in its pan-European service get “the best price,” and the cross-border competition that ERP has introduced between compliance schemes has served to drive down take-back costs.

The advantage of the networked approach is that partner companies are in a much stronger position to help steer the sustainability agenda, not just react to it. Indeed, rather than simply steeling themselves for the next round of legislative amendments to be handed down from the European Commission, ERP is leaping fast out of the gate with new and better proposals of its own. As ERP CEO Umberto Raiteri points out, “Our involvement in implementing the directive since 2005 across E.U. states gives us a unique insight into the complex issues involved.” This lends greater legitimacy to their efforts.

Companies should analyze how collaborative programs like ERP might be implemented in their own sectors and regions. They should take into account factors including the choice of collection and recycling locations, and how costs are allocated among members of the partnership.

2. Product Design: Lasting Choices
Product innovation arises out of a plethora of factors – from consumer demand to legal requirements. Some would argue that Extended Producer Responsibility (EPR) laws stimulate companies to pursue sustainable design in the development of their products. Studies have found evidence of certain design changes in anticipation of EPR laws – specifically in the case of some electrical and electronic equipment and cars in Japan and Sweden. Yet, on balance, it is unclear to what extent this happens on a large scale.

“Design for reuse” is only encouraged if take-back laws incentivize product or component reuse. Currently, no take-back law favors product reuse, because the focus is on product recycling for e-waste recovery. If companies were charged according to the number of products that end up in waste streams, then the incentive for manufacturers to extend the lives of their products becomes greater.

In its third Green Electronics Survey, Greenpeace assessed the environmental friendliness of the latest products to be on the market in 2011. Eighteen leading companies participated – from Acer to Wipro – and they submitted their products – ranging from notebooks to smartphones – to the test. Products were assessed for the use of hazardous chemical substances, power consumption, product life cycle and product innovation, with points awarded for special features that might reduce the energy taken in the production and shipping of the product.

The good news is that more products than ever are free of hazardous substances. However, when it comes to product life cycles and the amount of energy used during production, the report identified serious room for
We believe an approach based on individual producer responsibility will do more to boost sustainable product design, since the charges for e-waste will be borne by the manufacturers themselves.

improvement. The use of post-consumer recycled plastic, for instance, is not yet standard practice. Take-back practices are disjointed. What’s more, the minimum warranties offered across the industry never go beyond three years, and in the majority of cases have dropped to one year – another worrying sign of products’ dwindling life spans.

Greenpeace makes several practical suggestions “to ensure that greener products are not just useful talking points for marketing campaigns, but part of a company’s standard operating practice.”

- Expand the data collected at every phase of production, from supply-chain sourcing and procurement, to post-assembly shipping of products.
- Extend product life cycles and warranty periods. This means a shift away from planning obsolescence into products, and creating more upgradeable goods, with components available for longer. Move from a mentality of “designed to dump” to “designed to last.”
- Standardize peripherals and chargers, and work collaboratively to produce global, universally compatible solutions.
- Consider new business models and innovative technologies that empower consumers to measure their energy use in real time, with the aim of helping them to reduce it. Digital gadgets can support moves toward “dematerialization” and reduce consumption of limited natural resources.
- Don’t just think about product substitution – rethink the product itself.

To do all this requires a different approach. Systems and policies that compensate companies by units recycled may actually be discouraging companies to invest in sustainability. We believe an approach based on individual producer responsibility will do more to boost sustainable product design, since the charges for e-waste will be borne by the manufacturers themselves.

3. Closed-Loop Model: Going Full Circle
Past industrial business models followed a linear path: used products headed straight to the dump. In contrast, a closed-loop system implies the reuse of industrial materials for the creation of new products – what’s known as remanufacturing.

There is a widespread belief that take-back legislation mandates remanufacturing. Our research, however, indicates just the opposite. Because remanufacturing is not dealt with clearly under the WEEE Directive, it can entail additional costs for producers.

In several European countries, where take-back financing is based on the number of products a company puts on the market, a firm can generate one unit of waste but may have to pay twice for its recycling, unless the market share calculations discount the remanufactured product sales.

Companies like Xerox, HP and Canon have opted for closed-loop supply chains. They provide prepaid return kits, or eco-boxes, so that customers can send back their used cartridges to the company for free, which are then separated and reused in new printer cartridges and other products. They also remanufacture copiers, reusing and refurbishing old parts and materials, which can represent a cost savings of between 40 and 65 percent. Closed-loop systems can boost a company’s profits, while increasing the used-product return rate at the same time, with the ultimate goal being zero waste to landfills.

4. Technologies and Business Models: Time to Think Again?
Consider a producer that’s required to participate in a collective system with a single compliance scheme. In this case, used products from various producers are combined and recycled for material recovery. The result may be that the producer is paying to recycle others’ products, which could be remanufactured and later sold by someone else.
Faced with competing recycling obligations, a company will soon have to decide whether the time has come for it to confront a much bigger issue: its core operations.

Changing the shape and nature of your business operations can have a dramatic impact on the technologies you choose to invest in, or the business model you choose to adopt. This may entail extra costs that prove prohibitive. For some firms, this may put their very survival at risk. Incorporating remanufacturing, or a closed-loop supply chain, into your business model, as previously discussed, is one possible response.

Ready or Not
Companies should make sure they are informed of developments in their own countries. They should also make sure that well-qualified professionals oversee e-waste management issues within their organizations, and have a deep understanding of the impact of take-back policies on company performance. In light of all this, there are three critical steps that companies should take.

1. GET UP TO SPEED. Governmental websites, and those of NGOs, provide overviews of upcoming directives. The Electronics Take-Back Coalition (ETBC) has become a prominent source of information on evolving e-waste legislation. The ETBC website (www.electronicstakeback.com) publishes an annual Recycling Report Card on programs offered by television, computer, printer and game console companies.

2. BE PROACTIVE, NOT REACTIVE. It is crucial for companies to weigh in early, since changing laws once they have been passed is well-nigh impossible. Meeting policy makers face to face can be extremely helpful to clarify issues that may seem trifling to the untrained eye, but can have far-reaching repercussions for the business sector. Elected representatives are usually open to receiving new perspectives from those who can further their understanding of the economic effects of proposed legislation at local or national levels. Joining with coalitions of other firms will also help to communicate your position to key decision makers in a more concerted way. This means knowing those who are most closely involved with the relevant issues that affect your industry, and putting yourself in the mix.

3. DON’T BE COMPLACENT. In the face of impending laws, be as transparent and forthcoming with legislators as possible. Ignoring the politics behind new laws will not make them go away, and could even make their impact worse. A prime example is Microsoft, which over the past decade has locked horns with the European Commission. “When Microsoft first entered the crosshairs of European regulators in 1998,” reported The New York Times, “the company fought back with legal guns blazing.” Microsoft seemed to believe that its global dominance would win the day against European regulations. The company couldn’t have been more wrong. Not only did Microsoft lose, but it ended up having to make “unprecedented concessions.”

The moral of the story: Don’t think you can get by on sheer business might alone, or delude yourself into thinking that what works in one market applies equally in another. A chastened Microsoft has now said it will be more cooperative and adaptive to the stricter regulatory regimes in place – an attitude that other companies would be wise to assume from the start, and save themselves the legal headaches.

Legislation aside, there is one other impetus that ought to convince companies that proactive engagement with the sustainability agenda is in their own best interests: consumer demand. As another New York Times article recently observed, the economic downturn is making more consumers question “the propriety of, say, stuffing a still-working cell phone into a desk drawer in favor of a newer model.” Analysts are noting that Americans, at least, are holding onto their old goods – from cars to computers – for longer, and this “new frugality” looks set to become a lasting consumer trend.

TO KNOW MORE