

## The Impact of Take-Back Legislation on Remanufacturing

There are about 500 million obsolete computers in the U.S. alone. More than 130 million cell phones are tossed away annually. And there are about 24 million TVs sitting unused in homes and offices. This e-waste takes up space and adversely affects the environment. And with the green way of life gaining popularity, the public is demanding that something be done.

In response, 12 states already require original equipment manufacturers to take back damaged, unwanted or outmoded items -- and 12 more states are considering it. This means that electronics and electric products companies are going to have to go green one way or another.

Our research looks at take-back legislation, state-level requirements for electronics producers to be responsible for the remanufacturing and disposal of old or obsolete products. The result: thousands of pounds of waste (toxic and otherwise) diverted from landfills and used in remanufacturing.

### Considerations for Policy-makers

Before adopting take-back legislation, policy-makers first need to clearly identify their goals. In our research, we studied take-back legislation's effectiveness in achieving the solitary goal of increasing remanufacturing levels. However, for many regulators, take-back legislation provides a means for achieving several goals, such as shifting the cost of recycling off of tax-payers, encouraging manufacturers to design for longer product life, and encouraging use of more sustainable and easily recycled materials.

Based on our research, we developed the following considerations for policy-makers:

**Across-the-board collection levels can be counter-productive.** The same level of legislation (for example, setting the same collection target across a wide range of products) may induce remanufacturing when imposed on a product that is costly to manufacture. But when take-backs are required for a product that is inexpensive to manufacture new, the regulations may not spur any remanufacturing at all. Policy-makers must be aware of cost structures before imposing regulations that might not meet every stated goal.

**Take-back legislation isn't effective in third-party dominant markets.** Policy makers should especially be careful about imposing legislation on industries where remanufacturing is done predominantly by third-parties. Our research shows that remanufacturing levels may go down in these environments after legislation is imposed. Because legislation may induce the brand-name manufacturer to follow a strategy where they are taking back the products and disposing of them just to restrict the access of remanufacturers to the products while the brand-name manufacturer would not be following this strategy in the absence of legislation. Some remanufacturers already worry that the amount of cores available to them will decrease as a result of take-back laws due to cores going directly to collection centers where it is easier for the OEMs to pick them up (<http://www.techworld.com/green-it/news/index.cfm?newsid=9595>).

**Simultaneous development of collection and re-use levels is optimal.** Our research shows that policy-makers need to simultaneously decide on the right levels of collection and reuse targets. If the collection target is very high and the reuse target is set very low, it may not spur any more remanufacturing than the collection target does by itself. Given the administrative burden of enforcing legislation, this redundant legislation simply increases costs without resulting any environmental benefits. Some legislative bodies, like the EU may include such targets in its Waste Electrical and Electronic Equipment Directive as early as December 2008.

## **Implications for Manufacturers**

Looking at the number of countries that have some type of take-back legislation in effect, it's safe to assume that manufacturers will continue to face different forms of regulation. Given the inevitability of take-back legislation and the opportunity to meet consumer demands for "greener" electronics, manufacturers should start finding ways to make money using the materials they collect.

But how they do that will depend on their underlying product lines and the business environment in which they operate. Our research indicates that the optimal response may be to change the product mix (i.e. the mix of manufactured and remanufactured products).

Since take-back legislation will cause companies to incur extra costs from collection and disposal of materials, manufacturers able to create economic value from these materials can actually benefit from legislation.

Therefore, company management should make the following considerations:

**Profitability stems from production capabilities.** By appropriately allocating their production capacities to new and remanufactured products (especially if they already have in-house remanufacturing capabilities), OEMs can still achieve high levels of profitability. Under legislation, a company with high manufacturing but low refabrication cost may be more profitable than one with low manufacturing but high remanufacturing cost. That's because the profitability of remanufacturing, among other things, depends on the unit cost to remanufacture a product.

**The competition may be a potential partner.** Under the legislation, OEMs are forced to incur the collection cost of taking back the products. One way to offset that cost is to increase remanufacturing. And for OEMs with no in-house capability for that, third-party remanufacturers become valued partners because they represent a market for selling collected cores. Obviously the remade product and the OEM's new product will compete in the market, but by setting the price of the cores optimally, the OEM has the ability to maximize profit.

**Pre-emptive collection manages the marketplace.** When remanufacturing is very profitable, OEMs can "preemptively collect" all cores to restrict the remanufacturer's business. The original manufacturers are in a good position to explore the creation of take-back facilities that allow for collection of all the cores in a relatively cost-efficient manner. This may allow OEMs to collect and resell the cores to refabricators for less than their cost of collection. Conversely, when refabrication isn't highly profitable, OEMs can still collect some cores for sale to remanufacturers at a price lower than the cost of collection. This is beneficial since the OEM still makes a profit on the sale while saving on disposal cost.

**Design decisions can impact profits.** If the original product is not designed properly and/or is made of nondurable materials, it may be difficult and costly to remanufacture. However, if manufacturing is redesigned with remanufacturing in mind, then the remanufacturing cost can be brought down, making remanufacturing profitable. This showcases another area in which take-back legislation is a positive force for change. Since the research and development of changes in design costs money, few manufacturers are willing to rework products if there's no market or regulatory imperative.

In the final analysis, when developed thoughtfully and executed intelligently, take-back legislation can be good for the environment and good for business.

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