Hazardous Chemicals in Circular Economy

Recycled Material Can Only Be Profitable if It Fulfills the Same Criteria as Virgin Material

The concept of circular economy has long been a staple in the vocabulary of anyone who wants to come across as at least somewhat progressive. Today, circular economy is more than just a buzzword. One crucial, but often overlooked part of a circular economy is the role of chemicals. While considerable efforts are being made to reduce pollution and depletion of the earth’s resources by simply increasing recycling, little attention is paid to the contents of the old products that we turn into new ones.

The truth is that today’s chemicals legislations are not adapted for a sustainable circular economy, as many hazardous chemicals are unregulated and in widespread use. These chemicals fulfill thousands of different functions in all kinds of everyday household items. And as these items are the very same we recycle and turn into new products in a circular world, it also means we are recycling their toxic contents.

Luckily, a growing number of brands and retailers are realizing that, at the moment, legal compliance is neither a good benchmark for corporate chemicals management nor for a circular economy. In order to account for weak legislation and stay away from toxic chemicals in products and supply chains, many companies have internal chemical requirements that go beyond legal compliance.

Circular Economy as Business Opportunity

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In our society, the prices of raw materials and trash collection are increasing because of physical limitations. The resources available in the earth’s crust are simply shrinking. The “take, make, waste” paradigm within the linear economy has
led us to a critical point that also affects business, through higher commodity prices and higher volatility. This will lower margins and profitability for companies and increase consumer prices in the long run.

The idea of a circular economy is to manufacture components, articles and products that can be perpetually disassembled and re-used, thus creating a no-waste society and minimizing the strain on natural resources.

To simply use and discard is no longer a viable option. To achieve this change, however, both businesses and society need to re-think the way we make profits and design products.

In business, sustainability is sometimes seen as a necessary but nevertheless burdensome cost — not something that actually strengthens the business idea and profitability. In a sound circular economy, companies prosper due to environmental success, not despite it. There is a need for a change in the business mindset, so that company interests, societal needs and environmental challenges are merged into one business idea.

Since hazardous chemicals are common ingredients in all kinds of materials they obviously end up in recycled materials as well. This fact makes it virtually impossible to grow the market for recycled materials — the material transparency is simply too low for chemically progressive brands to want to reuse these materials in new products.

The way forward is increased transparency on the chemical contents of all materials. This information should follow materials all the way to the waste phase. Used properly it will raise the price of recycled materials. The end goal is to eliminate hazardous chemicals from waste streams through design and innovation, not dilution and costly risk analyses.

The use of recycled material can only be profitable in the long run for a company if it fulfills the same criteria as virgin material.

**Product Planning and Design**

A smart design is the most critical stage in a product’s life cycle. The most cost-effective approach is to select the appropriate materials and chemicals right at the drawing board, before the product even exists. By doing this, toxic waste can simply be “designed out” and instead replaced by resources and products that can be utilized by somebody else.

The greatest obstacles to successful recycling are actually the original design and lack of information about what chemicals were added to the materials from the very beginning. By demonstrating knowledge and transparency you add value to the
product. Products and materials that are designed to be recoverable, reconditioned and upgraded have around twice the value of products and materials that are not, as they can be sold several times. By decreasing the hazardous content of a product, you increase the possibilities for recycling and success in the aftermarket. You also reduce the need for virgin raw materials and the energy costs to produce them.

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As a consequence, chemicals management should have a higher priority on the corporate agenda. Depending on company goals, chemical issues can be prioritized at different levels. At the lowest, so-called reactive level you simply follow regulations and adapt on the fly. By contrast, at the highest and most ambitious level you actively seek out green chemistry and sustainable materials that position the organization for the circular economy.

Supply Chain Management, Transparency and Traceability

Since a product consists of components that are produced and assembled by many different suppliers in the supply chain, it is impossible to communicate the chemical content down the supply chain without proper information from the previous suppliers.

The need for systematic chemical control up and down the supply chain is already a priority for many companies. Unsurprisingly this need will only grow in the future as recycled materials are being circulated back into the production loop.

There are mainly two activities that are needed in order to approach the circular economy from a chemical point of view:

- increase knowledge of the composition of products, and
- phase out chemicals that do not fit within a circular economy.

Some industries have already created effective systems for transferring information between suppliers and users in the supply chain. The IMDS and BOM-check databases are already used in the automotive industry and the electronic industry respectively, and relevant parts may be accessed by everyone in the entire
supply chain.

Systems like this can be used to include extensive chemical information. The barcode system is another such example. It is technically very easy to include chemical information in a system like this; all you need is the information. The challenge lies in implementation and standardization. This change is happening already, as many brands with big purchasing power are pushing for more and more chemical transparency in the supply chain. By putting pressure on suppliers to increase chemical transparency and use safer alternatives, these companies serve as role models and pave the way for other, smaller companies to follow suit.

**Legal Compliance Is Not Enough**

Just as hazardous man-made chemicals are complex and wide reaching, so is the legislation set up to regulate them. The EU has enforced REACH (Registration, Evaluation, Authorization and Restriction of Chemicals), a comprehensive legal framework that addresses all chemicals in use and requires companies that market chemicals to present a set of test data. The US equivalent, TSCA (Toxic Substances Control Act), set some basic requirements but is much more limited in scope. In many other parts of the world there are other regulations in place to address chemicals, some aiming to be similar to REACH or TSCA. There are also many product-specific regulations in the EU and in other regions for controlling hazardous substances in products such as electronics.

But legal compliance does not guarantee automatic success in the circular market. In fact, this is far from the truth. Even in the EU, which in many ways has the most ambitious chemical regulation in place, substances with hazardous properties are still in widespread use. This is because regulation moves slowly, and it will take many years before REACH includes all the substances it intends to regulate. In addition, REACH does not fully cover the chemical content in articles that are imported into the EU.
The regulatory system for chemical control is therefore not a reliable guide for sustainable business or for identifying which substances are compatible with a circular economy. This is why chemically progressive companies are setting the bar higher than legislation and enforcing their own chemical requirements for products and supply chains. The number of such companies with their own chemical standards is increasing, and today represents sizeable chunks of their respective industries.

**Reuse and Recycling**

Many waste streams contain hazardous substances and should not be recycled without a prior decontamination step. In current business models, recycled materials struggle to be competitive with primary raw materials markets. This is often due to the fact that recyclers cannot deliver the level of material transparency that many brands are asking for. Recycling markets can only be sustainable if they can assure that recycled materials do not contain toxic substances. Willingness to support the development of non-toxic material cycles will thus not only protect health and the environment but will also enhance the quality of secondary raw materials and boost recycling markets.

Legally, in order to incentivize high-quality recycling, there is a need to avoid creating a two-tier system between virgin and raw materials, or between products and articles imported from the EU and those imported from elsewhere. Recycling should never be viewed as a low-cost solution. It might sound contradictory, but setting identical, strict rules for recycled materials will help them compete with virgin materials. It is a fact that regulation drives innovation, and recycling is no exception. Putting the appropriate legislation in place is not a burden, it will provide clarity and is essential to establish a circular economy.

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