

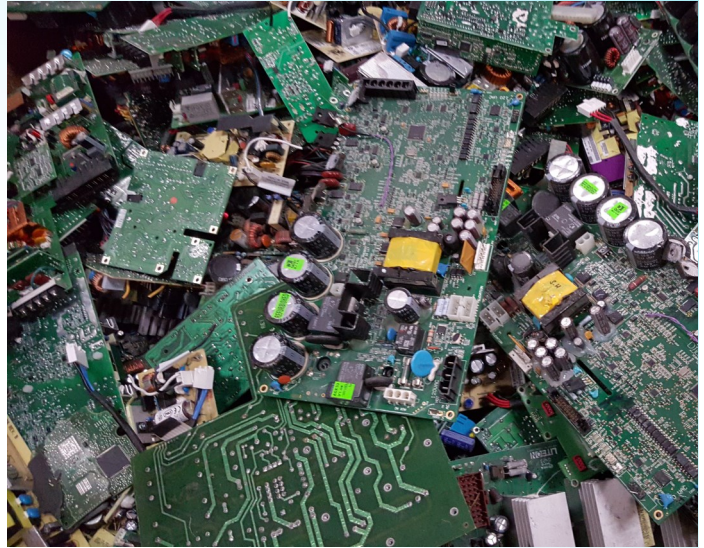
## Recovering Precious Metals

### *Reducing Electronic Waste's Negative Impact on the Environment*

Believe it or not, the quickly changing and fast moving pace of technology is having a huge impact on the environment worldwide.

Who hasn't chased after the newest product, whether it is a Blu Ray Player, Flat Screen TV, Computer, Printer, Cell Phone, etc. Today almost everything in your home has a Printed Circuit Board (PCB) in it. Not only do the products listed above have a circuit board, their controllers contain one as well. Even mundane items such as blenders and air-conditioners contain PCB's.

Due to the rapid changes in technology, changes in media (tapes, software, MP3), falling prices, and planned obsolescence there is a fast-growing surplus of electronic waste, or e-waste, around the globe. Display units (CRT, LCD, LED monitors), processors (CPU chips), memory (RAM), and audio components have different useful lives. Processors are most frequently outdated by software and are likely to become e-waste. Display units are most often replaced while working and without any repair attempts due to changes in wealthy nations' appetites for new display technology, again adding to the ever growing amount of electronic waste.



Although referred to as waste this e-waste actually contains valuable and scarce materials among its hazardous materials. Up to 60 elements can be found in complex electronics. In the United States, an estimated 70% of heavy metals in landfills come from discarded electronics. Yet checking the EPA web site (Federal Legislative Mandates for Electronics Recovery) it clearly states that: At present, there is no federal mandate to recycle e-waste. There have been numerous attempts to develop a federal law, yet to date there is no consensus on a Federal approach.

Not only are our landfills filling up with e-waste from all these electronic products but now other countries are being filled up as well. The exportation of unscreened electronic waste to countries, such as China, India and parts of Africa, is a prominent issue in the world today. By exporting their waste to other countries companies avoid the expense of properly preparing products for disposal, like removing items such as bad cathode ray tubes, the processing of which is expensive and difficult. Countries, especially ones still developing, have become dumping grounds for toxic e-waste.

Lower environmental and work place standards, cheap labor, and the relatively high value of recovered raw materials lead to not only the transfer of e-waste but also the transfer of pollution-generating activities related to processing these electronics, such as the smelting of copper. In China, Malaysia, India, Kenya, and in various African countries, electronic waste is being sent specifically for processing to avoid stricter regulations found in other countries. The reality is, if handled properly, this e-waste does not have to be exported and can be profitably processed.

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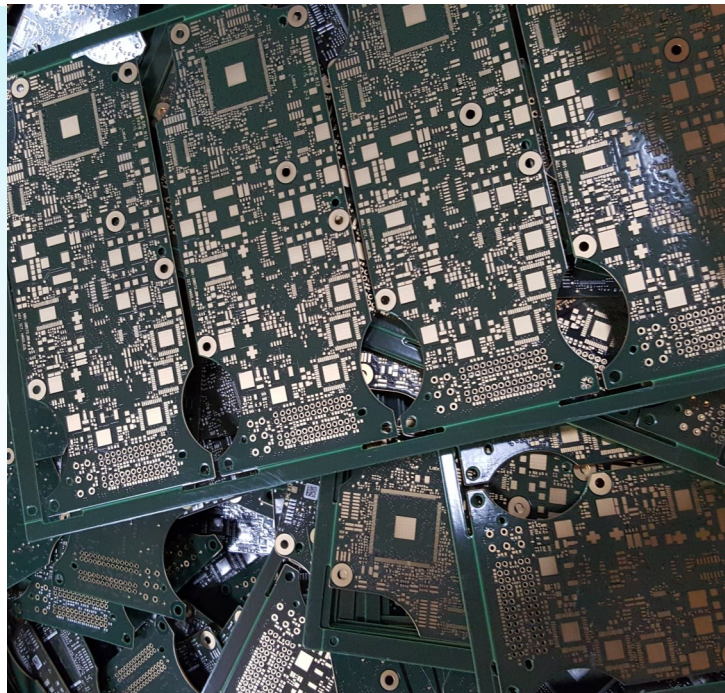
...Mech-Chem is working with a company that has a chemical process to remove the toxic materials as well as the precious metals from circuit boards. Not only are the toxins removed, but the main objective is to sort the remaining materials and reuse them. Mech-Chem's expertise in material handling coupled with the chemistry developed has led to an economic way to reclaim these e-waste products.

The steps of this process can be simply described as follows: Using proprietary chemistry, metals such as copper, lead, tin, etc. are dissolved. The main objective in removing these metals is to have them release the components (resistors, potentiometers, capacitors, inductors, relays, diodes, transistors, rectifiers, integrated circuits, etc.) they are holding on the circuit board. In addition the small components, which are now detached from the board, can be recycled along with the metal rich hydroxide sludge produced during the wastewater treatment process. This first step also creates the added feature of leaving behind the fiberglass board with the exposed precious metals (gold, silver, etc.).

Using a second, different set of chemistry, the gold, silver and other precious metals are then dissolved. Finally, via a series of subsequent steps, (Ion Exchange, Electro-Winning and Filtration), the gold and other metals are capable of being captured and reclaimed.

At the end of the process, the only item left is a fiberglass board, which the industry is starting to recycle.

Mech-Chem's expertise in engineering systems, fabrication of scrubbers and process lines, as well as waste water treatment and acid recovery has assisted this company in taking their chemistry and developing entire facilities dedicated to eliminating the environmental danger that electronic e-waste presents.



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