

Recycling tech gadgets to reduce environmental pollution

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The Silicon Valley innovation miracle that has ushered in dizzying new ways for people to live, work and play also has intensified the pressure to find environmentally responsible ways to dispose of gadgets rendered obsolete.

"This is more complex than cans and bottles," said Jeff Hunts, manager of the CalRecycle [electronic waste](#) recycling program. "The bottle or can you drank from will soon become another bottle or can. E-waste is much more complicated."

Responsible disposal of [electronic devices](#) may require solutions that can match the innovation that went into the creation of those phones, TVs, games and drones.

"An electronic device might have 25 different types of materials, and we attempt to process the materials into the original separate material types, which means we have to go through multiple steps of separation," said Jim Taggart, chief executive of Valley-based ECS Refining.

Besides pulling apart the plastic, metal, wires, batteries and other components, the materials also have to be run through a gauntlet of shredders and sorters, often with extra care to isolate hazardous elements.

"All of these high-tech devices that we enjoy using have material issues that need to be dealt with at the end of their lives," Hunts said. "There

are a lot of legacy devices that require proper attention and handling."

Cathode ray glass has typically been sent to facilities in Mexico and India, with India-based Videocon Industries handling the ultimate conversion of the glass. The furnaces at Videocon were out of commission in recent months, which disrupted the processing chain for cathode ray glass, but the Videocon facility has recently resumed operations, Hunts said.

Among the items handled by ECS Refining, e-Recycling and other electronic recycling specialists around the Bay Area: computers, laptops, televisions, monitors, VCRs, stereos, copiers, fax machines, printers, e-notebooks, tablets, and of course, the ubiquitous smartphone and its ever-expanding numbers.

"Anything that has a logic circuit in it, a computer, a monitor, a cellphone, and other devices, would be considered electronic waste," Hunts said. "But it's not necessarily everything with a battery or a cord. There is no precise legal definition for what is an electronic device."

Still, state and local government agencies in California, as well as waste disposal operators, are hoping to increase the opportunities for convenient disposal of e-waste to avoid filling landfills with sometimes dangerous components.

"Some of the trash companies will allow you to dispose of electronic items through the bulky pickups they offer during the year," said Russ Caswell, general manager of a recycling plant of e-Recycling of California. "We attend recycling events such as at a park, parking lots, transit lots. Sometimes notices are hung on doors to alert people to about events or people willing to pick up electronic items."

What's more, despite the potential gray areas, consumers must shoulder

the burden to try to figure out what to do with their electronic devices.

"The way the law is set up in California, it's the responsibility of the generator of any waste to recognize its characteristics and manage it," Hunts said.

The 2004 cellphone recycling act, for example, was designed to outline the requirements for how consumers can get rid of a cellphone.

"That legislation required all retailers of cellphones to take back unwanted phones," Hunts said. "This applied to either the phone they had sold in the first place, or if the consumer wanted to get rid of their old phone, the retailer had to take back that old phone."

Over the approximately one decade during which California has been tracking e-waste disposal statistics, the volume of e-waste that's been recycled has fluctuated from year to year and has declined from its peak year of pounds recycled.

In 2005, the first year of the e-waste program, recyclers submitted 225 claims to the state for payment totaling \$31 million for an estimated 65 million pounds of e-waste that was recycled.

Those numbers rose steadily the next few years and peaked in 2008, when recyclers submitted 412 claims seeking \$96 million in payment for 218 million pounds of e-waste.

The e-waste recycling activity gyrated the next few years and eventually rose to another peak, in 2012, when recyclers submitted 318 claims with a combined value of \$83 million for 212 million pounds that were recycled.

Approved recyclers can submit claims to CalRecycle, which will then

pay the recyclers based the weight, type and ultimate handling of the processed materials, among other factors. Claims typically are submitted once a month. After that, the state reimburses the recyclers, who pay those who submitted the devices originally.

"We are seeing more awareness and growing participation of trying to do e-waste recycling the right way, more than other places," Caswell said. "People in the Bay Area tend to be more environmentally minded."

Not all devices can be officially recycled under the California covered electronic waste program. "Covered electronic devices" are items that the state's Department of Toxic Substances Control deems to be hazardous at the time they are discarded.

These devices include TV sets and computer monitors with cathode ray tubes, TV sets and computer monitors with liquid crystal display (LCD) screens, laptop computers with LCD screens, plasma TV sets, and personal, portable DVD players with LCD screens.

Many consumers are accustomed to pocketing some cash when they bring their cans and bottles to a recycling center. But they shouldn't necessarily expect the same sort of micro bounty should they attempt to properly dispose of e-waste. Because electronic devices have greatly differing recycled values, people might wind up actually having to pay to properly dispose of numerous types of items.

"Many devices cost a lot more to process, and they have little residual value after being recycled," Taggart said.

A printer has a commodity value of 5 cents a pound after its components have been recycled, but costs 25 cents a pound to process, Taggart said. A desktop or laptop computer has a commodity value of 25 cents a pound and costs about 25 cents a pound to process, he estimated.

In sharp contrast, a smartphone has a commodity value ranging from \$2.50 to \$3 a pound after being recycled, while the processing cost is about \$1 a pound.

"Cellphones are so tiny and so efficiently manufactured, there is a much higher precious metals weight," Taggart said.

Since recyclers have been submitting claims, starting in 2005, they have sent the state of California an aggregate 3,250 claims.

The claims are worth a total of \$810 million.

The total amount of recycled electronic waste processed in California equals 1.9 billion pounds.

That total amount equates to roughly the weight of three Empire State Buildings.

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