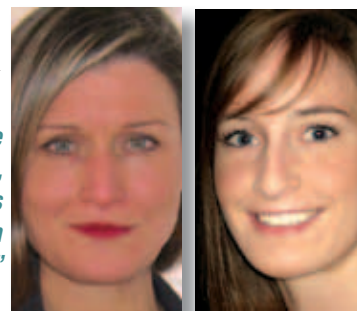


by Clarissa Morawski &  
Samantha Millette

*“Currently, the only province that requires independent, certified auditing of processors and reported program performance is Alberta.”*



# Waste Electronics Management in Canada

Shortcomings and opportunities for improvement abound

**P**ainting an accurate picture of the total scope of the electronic waste problem is like playing a game of Whac-A-Mole: the only thing that’s constant is change. Each year, millions of new electronic gadgets are produced and sold, rendering those from five, seven, or twenty-five years ago obsolete. We own more electronics in different formats than ever before, and each of these devices has a shorter life span than its predecessor.

Sometimes obsolescence is measured in months.

Apple’s familiar iDevices illustrate this phenomenon. Every time

the company launches a new product, it shows faster sales growth than the previous device. Within two years of its launch, the iPad exceeded 55 million units sold worldwide. Apple’s CEO Tim Cook sums up this growth: “To put it in context, it took us 22 years to sell 55 million Macs, about five years to sell 22 million iPods, and about three years to sell that many iPhones ... it’s on a trajectory that’s off the charts.”

As a result of our never-ending appetite for the latest and greatest gadgets, waste electrical and electronic equipment (WEEE) is now one of the world’s fastest growing waste streams. From smart toasters to smart

## RARE EARTH ELEMENTS

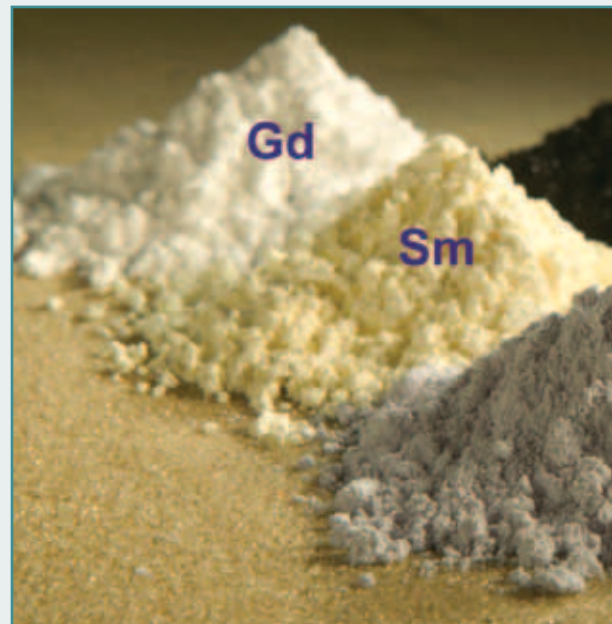
**S**everal metals are not yet a significant part of the electronic waste stream but are certainly going to be a larger part of the e-waste conversation in the future. Every iPhone or iPad, and most of the other smart phones and tablets that are dominating the sales of personal computing electronics today, contain many of the elements called “rare earths.”

The amounts of these elements in today’s mobile devices are miniscule. This circumstance, combined with the fact that most of these devices are still in use today, means that the recycling industry has not yet found a way to make it economically viable to recycle these rare-earth materials.

According to SIMS Recycling Solutions President Steve Skurnac, “Rare earths come in very minute concentrations in electronic scrap,” which means that recyclers need a high volume and super efficient processes to recover any reasonable amount of rare earths from electronics. The technology just isn’t there to make it economically feasible for most recyclers.

Right now, most of these devices are still in use, either by a first or subsequent owner. But as the technology gets increasingly desirable with more functionality, many are replacing their devices with new ones that are much faster than their previous device. Some companies are now offering to replace mobile devices each year.

Worldwide, smart phone sales are expected to reach over a billion by 2015. In Canada, a report by the Media Technology Monitor, a research product of the CBC, estimated that, as of



phones, our waste has become a highly complex heterogeneous mix of an ever-growing assortment of plastic resins, heavy metals and toxins requiring safe handling at the end of their useful life.

In 2004, Alberta became the first Canadian province to establish a program for the proper end-of-life (EOL) management of WEEE. Since then, nearly all provinces have followed suit. (Today, New Brunswick is the only province without a WEEE program). Despite this progress many challenges remain, in particular in relation to recycling standards, performance measurement and export control.

## STANDARDS

So, in terms of WEEE management, how does Canada fare?

In Canada, to become an approved electronics recycler under any of the industry-led provincial WEEE programs, the primary recyclers'

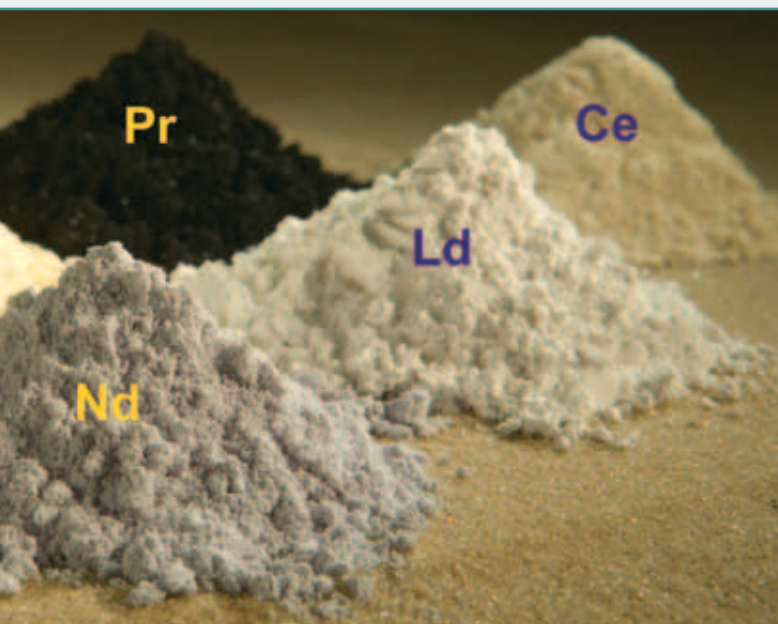


operations — as well as those of all downstream recyclers — must meet the requirements of the Electronics Recycling Standard (ERS). The ERS is managed by the Recycler Qualification Office which operates under the Electronic Products Recycling Association (EPRA) — a national non-profit entity created by Canada's electronics industry.

In December 2012, the International Sustainable Development Foundation commissioned a report aimed at better understanding how leading certifications and standards for WEEE management stacked up against those of the Institute for Electronic and Electrical Engineers (IEEE).

The IEEE's 1680-series standard is considered the *de facto* standard for sustainable desktop computers and serves as the verification requirement for the Electronic Product Environmental Assessment Tool used by manufacturers.

While Canada's electronics recycling standards were found to meet



Rare earths are not uncommon at all but are not usually found in concentrations that lend themselves to extraction.

autumn 2012, 26 per cent of the population owned a tablet, more than five times the number that owned one when a similar study was done in the spring of 2011.

What all this means is that, with demand for these devices skyrocketing, demand for rare earth elements is going to increase as well. Many of these elements are not actually rare, but expensive and difficult to extract. Not only are rare earths in high demand for electronic devices, they're also needed for emerging technologies such as hybrid vehicle batteries. They're also difficult to recycle and to replace with a substitute material.

But the primary reason that the entire rare earth group of elements is on the list of critical raw materials is that production is dominated by China, which has imposed export restrictions and quotas. These not only could, but already have, disrupted world supply.

So we have materials that are highly sought after but extremely difficult to obtain, yet there are millions of minuscule amounts of them in our pockets and purses. The need to recycle these materials may define electronics recycling in the future.

## BEST PRACTICES FOR MANAGING WEEE

**W**hile Canada has made remarkable strides in managing WEEE, opportunities abound for improvement. Here are some noteworthy examples:

**E-WASTE LANDFILL BANS:** When properly designed, phased in, and implemented, WEEE landfill bans can play a huge role in diverting WEEE from the waste stream. Bans could be outright material exclusions or requirements for pre-sorting or pre-treatment. One approach would restrict the amount of WEEE allowed in landfills; in this case, loads exceeding the allowable amount of banned material would be denied entry or be subject to a hefty fee. Another approach would ban WEEE from landfill altogether. Regardless of how a ban is implemented, the penalty must be set at a high enough level to serve as an effective deterrent. Examples of Canadian municipalities with e-waste bans in place include the City of Waterloo, North Bay, and the Nanaimo Regional District in BC.

**INDIVIDUAL PRODUCER RESPONSIBILITY (IPR):** Individual producers should be responsible for the end-of-life management of their products and packaging. When producers are able to pass their stewardship obligations (and legal liability) onto a third-party, as is the case under the current regime, there's little incentive to design products for the environment (DfE).

**MEANINGFUL PERFORMANCE MEASURES:** Traditional performance metrics provide limited insight into two aspects of resource sustainability critical for the electronics recycling industry: (1) recovery of economic and environmental value; and (2) reduction of emissions from end-of-life management practices. Performance measures that relate to the efficiency of the actual recycling process and to the final destination of material (e.g., recycling rate, greenhouse gas emissions avoided) should be utilized to offer further insight into how these programs are performing in respect to environmental objectives.

**THIRD-PARTY AUDITS:** Auditing must be on-site and performed on a regular basis.

Scheduled audits should be augmented with a series of spot audits. Qualified auditors familiar with the particular complexities and challenges of WEEE are required.

**MASS-BALANCE ACCOUNTING:** All incoming and outgoing material must be accountable to a mass balance check. This requires balancing all inputs and outputs and provides an opportunity for reconciliation to ensure that no WEEE is unaccounted for.

**PROVINCE-WIDE STANDARDS:** To ensure that all WEEE is managed properly, conformance to the Electronics Recycling Standard (ERS), and other standards set by the Recycler Qualification Office, should be made a requirement in an operator's Environmental Compliance Approval. (Currently, the ERS is applicable only to recyclers managing WEEE that has been approved under an EPRA-operated stewardship program.)

**GOVERNMENT-SET STANDARDS:** In order to eliminate the inherent conflict of interest that exists when industry is able to set its own rules, standards should be developed, implemented, and enforced by government agencies.

**IMPROVED EXPORT CONTROL:** The exact volume of e-waste exported from Canada is unknown. This is mainly due to the fact that under the current materials tracking system, WEEE can be declared under a variety of codes and labels; what may be considered "hazardous goods" in one country, for instance, may not be considered hazardous in another. To resolve this issue, federal agencies (such as Statistics Canada and Canada Border Services Agency) should work together to develop and implement specific harmonized tariff codes for WEEE (e.g., codes for material destined for recycling, for reuse, etc.). It should also be made incumbent on the exporter (i.e., Canadian recyclers and/or processors) — not the importing country — to prove that exported WEEE items are functional.

similar criteria as others, they continue to fall short in several key areas.

For starters, unlike the US e-Stewards and R2 standards, the ERS does not require that recyclers be certified by an accredited certification program, or that audits be conducted by an independent third-party. Currently, the only province that requires independent, certified auditing of processors and reported program performance is Alberta.

The ERS is also deficient when it comes to addressing WEEE originating outside of a provincial stewardship program. While it specifies that e-waste may only be exported to countries legally permitted to accept the material, the standard is silent with regards to how "non-program material" should be treated. Imported and commercial WEEE that finds its way into Canadian operations is governed only by a set of rules outlined in provincial laws, which vary by province.

Also at issue is the fact that most programs (except those in Alberta) approve the RQO standards as part of their stewardship plan; this means that, ultimately, stewards are in control.

The lack of government-set standards makes maintaining a level playing field among recyclers — one that encourages competition while ensuring environmental protection — difficult.

The implications of an uncompetitive market can be seen in Ontario.

In 2011, Ontario Electronic Stewardship (OES) changed the weighting of environmental performance in the allocation of WEEE to processors. Essentially, OES's new processor selection criteria increased the emphasis on cost competitiveness to 55 per cent of the total score (up from 30 per cent) while reducing recycling efficiency to 20 per cent (down from 50 per cent). As a result, the fees paid out to processors declined significantly.

While such cost declines could be attributable to a number of factors, such as improved commodity markets, they're more likely the result of OES shifting its selection criteria from one that emphasized the importance of a high recycling rate to one that prioritizes costs, with little regard for material quality.

## MEASURING PERFORMANCE

It's often said you can't improve what you don't measure.

Currently, the performance of most provincial WEEE programs is measured on indices of program results, such as the collection rate. Programs with high collection rates are considered a success, while a low collection rate is assumed to represent an inefficient recycling program.

This notion is problematic for several reasons, chief among them is the fact that weight (mass) is one of the main factors that affects the calculation of collection rates, which is a weak indicator of environmental impact. Tonnage only reveals how much material is diverted from disposal, but this has no direct relationship with environmental goals; it says nothing about the composition of WEEE (e.g., toxicity, recycled content, etc.), and offers no information on the types or amounts of recovered materials.

Further complicating the issue is that the size and weight of collected materials is con-



Rich country.

stantly changing. The trend towards product light-weighting and miniaturization, and producing multi-functional devices, suggests that the tonnage of WEEE collected over time may actually decrease.

Lastly, mass-based metrics provide no information as to what happens to material after it's collected. Is WEEE being managed in a way that protects human health and the environment? Are valuable components, such as gold and silver, recovered or simply discarded? Current performance metrics, for the most part, are silent on these issues.

### THE EXPORT MESS

Despite clear commitments to the contrary, evidence suggests that WEEE containing hazardous materials continues to be exported from Canada to developing countries.

How does this continue to happen?

The primary problems concern definition and enforcement. Both the Basel Convention and the Canadian Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations forbid export of hazardous waste for disposal, but they allow for shipments of electronics to be exempted from regulation if they're sent for "reuse."

Ostensibly this policy is good as it encourages reuse and provides a channel for poorer countries to get expensive electronic goods at low prices. The problem is that it remains fairly simple for a shipper to claim that a shipment is designated "for reuse" even when this may not be the case.

To make matters worse, it's becoming increasingly difficult to track



Poor country.

down those responsible for shipping these wastes as a complex smoke-screen of brokers, shipping agents and other intermediaries has become standard practice.

### WHERE DOES E-WASTE GO FROM HERE?

Most Canadians (whether from government, business, or the general public) would agree that while we have made significant strides, there's still a long way to go. Ensuring that all the facilities that handle our e-waste, whether in Canada or abroad, maintain high operating standards with independent, certified auditing is paramount.

As Canadians, we should do what it takes to make sure the system in place works as intended and that no one (today or in the future) is harmed by our e-waste. ♻️

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*Clarissa Morawski is Principal of CM Consulting in Peterborough, Ontario. Contact Clarissa at [clarissa@cmconsultinginc.com](mailto:clarissa@cmconsultinginc.com)*

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*Samantha Millette is Research Analyst with CM Consulting. Contact Samantha at [samantha@cmconsultinginc.com](mailto:samantha@cmconsultinginc.com)*