

Reduce Reuse Recycle



INTRODUCTION

RECYCLING

Recycling is the process of converting waste materials into new materials and objects. It is an alternative to "conventional" waste disposal that can save material and help lower greenhouse gas emissions. Recycling can prevent the waste of potentially useful materials and reduce the consumption of fresh raw materials, thereby reducing: energy usage, air pollution (from incineration), and water pollution (from landfilling).

Recycling is a key component of modern waste reduction and is the third component of the "Reduce, Reuse, and Recycle" waste hierarchy. Thus, recycling aims at environmental sustainability by substituting raw material inputs into and redirecting waste outputs out of the economic system.



There are some ISO standards related to recycling such as ISO 15270:2008 for plastics waste and ISO 14001:2015 for environmental management control of recycling practice.

Recyclable materials include many kinds of glass, paper, cardboard, metal, plastic, tires, textiles, batteries, and electronics. The composting or other reuse of biodegradable waste—such as food or garden waste—is also a form of recycling. Materials to be recycled are either delivered to a household recycling center or picked up from curbside bins, then sorted, cleaned, and reprocessed into new materials destined for manufacturing new products.

In the strictest sense, recycling of a material would produce a fresh supply of the same material—for example, used office paper would be converted into new office paper or used polystyrene foam into new polystyrene. This is accomplished when recycling certain types of materials, such as metal cans, which can become a can again and again, indefinitely, without losing purity in the product. However, this is often difficult or too expensive (compared with producing the same product from raw materials or other sources), so "recycling" of many products or materials involves their reuse in producing different materials (for example, paperboard) instead. Another form of recycling is the salvage of certain materials from complex products, either due to their intrinsic value (such as lead from car batteries, or gold from printed circuit boards), or due to their hazardous nature (e.g., removal and reuse of mercury from thermometers and thermostats).

REUSE

Reuse is the action or practice of using an item, whether for its original purpose (conventional reuse) or to fulfil a different function (creative reuse or repurposing). It should be distinguished from recycling, which is the breaking down of used items to make raw materials for the manufacture of new products. Reuse – by taking, but not reprocessing, previously used items – helps save time, money, energy and resources. In broader economic terms, it can make quality products available to people and organizations with limited means, while generating jobs and business activity that contribute to the economy.[1]



Historically, financial motivation was one of the main drivers of reuse. In the developing world this driver can lead to very high levels of reuse, however rising wages and consequent consumer demand for the convenience of disposable products has made the reuse of low value items such as packaging uneconomic in richer countries, leading to the demise of many reuse programs. Current environmental awareness is gradually changing attitudes and

regulations, such as the new packaging regulations, are gradually beginning to reverse the situation.

One example of conventional reuse is the doorstep delivery of milk in glass bottles; other examples include the retreading of tires and the use of returnable/reusable plastic boxes, shipping containers, instead of single-use corrugated fiberboard boxes.:

REDUCE:

3Rs refers to three terms often used when talking about waste: Reduce, Reuse, and Recycle. Reducing is cutting back on the amount of trash we make, reusing is finding a new way to use trash so that we don't have to throw it out, and recycling is using trash to remake new goods that can be sold again.

There are other ways to reduce your consumption without limiting purchases. Buying foods in bulk often means less packaging waste. Buying in bulk is useful if you are sure you will need the full quantity you're buying. Otherwise, it could be wasteful if you can't use all of the goods before they expire.

Budgeting can also help you reduce resource consumption. If you are thinking about a new computer, but your old computer works well, save up your money little by little until you can afford a new one without using a credit card or payment plan. By the time you've gotten the money saved up, you may actually *need* the new computer, or you may have realized there's a better use for your saved-up money.



REVIEW OF LITERATURE

Recycling minimizes pollution

All forms of pollution in the modern world emanate from industrial waste. Recycling of these industrial wastes such as plastics, cans, and chemicals go a long way towards considerably cutting back on levels of pollution because these waste products are reused rather than just being thrown away recklessly.

Protects the environment

The great benefit of recycling waste material is that it plays a big part in protecting Mother Nature in the most balanced way. While many trees are felled every day, recycled paper manufactured from specific trees is continually utilized to reduce deforestation. This classical example demonstrates that other natural resources can be recycled and made useful this way to conserve the environment.

Recycling minimizes global warming

It is perfectly true that recycling minimizes global warming and its grave impacts. During waste disposal, huge amounts of waste are combusted that lead to emission of vast greenhouse gases such as carbon dioxide, sulfur, and nitrogen, which contribute to climate change and global warming.

Recycling process involves minimal combustion and waste is transformed into reusable materials with zero or minimal harmful impact on the environment. The whole process of processing and manufacturing products from waste materials emits few greenhouse gases because the very waste recycling industries burn little fossil fuels.

Conserves natural resources

If the process of recycling used and old materials was not there, it means new products will be manufactured by extraction of fresh raw materials underneath the earth through the process of mining and extraction. Recycling is a surefire way of conserving existing raw materials and protecting them for future use. Taking steps to conserve natural resources like minerals, water and wood ensures sustainable and optimal use.

Recycling cuts down amount of waste in landfill sites

Recycling old and used materials into reusable products enormously reduces the possibility of choking of landfill sites. This is beneficial because it helps minimize land and water pollution since landfills contribute mightily to environmental degradation.

Recycling ensures sustainable use of resources

Recycling guarantees that existing resources will be used sensibly and sustainably. The recycling process alleviates the possibility of discriminate use of raw materials when they are obtainable in huge supply. Governments these days have stepped in to encourage recycling from lower levels, for instance, schools, small-sized organizations and also at global levels. This means that manufacturing industries can leave existing natural resources for exploitation by our children in the future without affecting current production.

Recycling contributes to creation of jobs

To add to the benefits it brings to the environment; recycling opens up job opportunities. Recycling means many recycling plants will be set up, thus, leading to a long chain of collection and delivery. All these activities are performed by humans, so this will trigger an explosion of opportunities.

Reduces energy consumption

A lot of energy is used to process raw materials in the course of manufacture. Recycling plays a big role in reducing energy consumption, which is vital for large-scale production, for instance, mining and refining. Recycling also renders the whole process of production less expensive, which is a great victory for manufacturers.

ADVANTAGES OF REUSE

REMANUFACTURING

The most involved reuse organizations are "repair and overhaul" industries which take valuable parts, such as engine blocks, office furniture, toner cartridges, single-use cameras, aircraft hulls, and cathode ray tubes (CRTs) and refurbish them in a factory environment in order to meet the same/similar specifications as new products. Xerox (copy machines), and Cummins Engine are examples of refurbishing factories in the USA. Rolls Royce has a very large aircraft remanufacturing factory in Singapore; Caterpillar recently announced the opening of a tractor refurbishing plant in China.[citation needed] Some factories operate in competition with the original equipment manufacturer (OEM). When the refurbished item is

resold under a new label (used monitor CRTs made into TVs, or cameras resold under a new label) this has been found legal by most courts.[citation needed]

When the item is resold under the same OEM name, it is informally considered a "gray market" item - if it is sold as used, it's legal, if it's represented as an OEM product eligible for rebates and warranties, it is considered "counterfeit" or "black market".[citation needed] The automobile parts industry in the USA is governed by laws on the disclosure of "used" parts and, in some states, mattresses which have been used are required to be sanitized or destroyed.[8] Whether these laws are in place to protect consumers from black market items, or to protect manufacturers ("hindsight obsolescence"), is often an area of intense debate.[citation needed] *Fuji Photo Film Co. v. Jazz Photo Corp.* is a recent example of the war between patent holders and refurbishing factories. To quote the 2003 District Court of New Jersey: "Thus, the key issue in the dispute between Fuji and Jazz is whether the cameras sold by Jazz are "refurbished" in such a way that they can be considered to have been permissibly "repaired" or impermissibly "reconstructed."

REUSABLE PACKAGING

Reusable glass bottles collected in Bishkek, Kyrgyzstan. Deposit values (0.5-2 Kyrgyz som) are posted next to the sample bottles on the rack

Deposit programs offer customers a financial incentive to return packaging for reuse. Although no longer common, international experience is showing that they can still be an effective way to encourage packaging reuse.[citation needed] However, financial incentive, unless great, may be less of an incentive than convenience: statistics show that, on average, a milk bottle is returned 12 times, whereas a lemonade bottle with a 15p deposit is returned, on average, only 3 times.[citation needed]

Refillable bottles are used extensively in many European countries; for example in Denmark, 98% of bottles are refillable, and 98% of those are returned by consumers. These systems are typically supported by deposit laws and other regulations.

Sainsbury Ltd have operated a plastic carrier bag cash refund scheme in 1991 - "the penny back scheme".[10] The scheme is reported to save 970 tonnes of plastic per annum. The scheme has now been extended to a penny back on a voucher which can be contributed to schools registered on the scheme; it estimates this will raise the savings in plastic to 2500 tonnes per annum.

The 600 ml brown bottle is the "standard beer reused bottle" in Brazil.

In some developing nations like India and Pakistan, the cost of new bottles often forces manufacturers to collect and refill old glass bottles for selling cola and other drinks. India and Pakistan also have a way of reusing old newspapers: "Kabadiwalas" buy these from the readers for scrap value and reuse them as packaging or recycle them. Scrap intermediaries help consumer dispose of other materials including metals and plastics.[citation needed]

5 STEPS TO REDUCE YOUR POWER CONSUMPTION

1. SHUT DOWN YOUR COMPUTER:

Computers are some of the biggest energy users in office buildings. Turn your monitor off at night and ditch the screensaver. Today's computers can be turned on and off over 40,000 times. Opting to shut down over using a screensaver does not affect your computer's lifespan. (Energy Star). So power down!

2. CHOOSE THE RIGHT LIGHT:

LED bulbs are the most energy efficient lighting option. LED bulbs use 75% less electricity than incandescent bulbs (Energy Star). They also have no mercury, and last about 25 times longer than traditional incandescent bulbs (DoE).

3. ELIMINATE VAMPIRE POWER: UNPLUG IDLE ELECTRONICS:

Devices like televisions, microwaves, scanners, and printers use standby power, even when off. Some chargers continue to pull small amounts of energy, even when plugged in (a good judge of this is if a charger feels warm to the touch). In the US, the total electricity consumed by idle electronics equals the annual output of 12 power plants (EPA).

4. USE A POWER STRIP TO REDUCE YOUR PLUG LOAD:

To avoid paying for this "vampire power," use a power strip to turn all devices off at once. Flipping the switch on your power strip has the same effect as unplugging each socket from the wall, preventing phantom energy loss.

5. TURN OFF THE LIGHTS:

We should just use the amount of light that are required, instead of wasting energy we should save it.

CLOSED-LOOP PROGRAMS

These apply primarily to items of packaging, for example, where a company is involved in the regular transportation of goods from a central manufacturing facility to warehouses or warehouses to retail outlets. In these cases there is considerable benefit to using reusable “transport packaging” such as plastic crates or pallets.

The benefits of closed-loop reuse are primarily due to low additional transport costs being involved, the empty lorry returning with the empty crates. There have been some recent attempts to get the public to join in on closed loop reuse schemes where shoppers use reusable plastic baskets in place of carrier bags for transporting their goods home from the supermarket; these baskets fit on specially designed trolleys making shopping supposedly easier.

REFILLING PROGRAMS

There have been some market-led initiatives to encourage packaging reuse by companies introducing refill packs of certain commodities (mainly soap powders and cleaning fluids), the contents being transferred before use into a reusable package kept by the customer, with the savings in packaging being passed onto the customer by lower shelf prices. The refill pack itself is not reused, but being a minimal package for carrying the product home, it requires less material than one with the durability and features (reclosable top, convenient shape, etc.) required for easy use of the product, while avoiding the transport cost and emissions of returning the reusable package to the factory.

REGIFTING

Some items, such as clothes and children's toys, often become unwanted before they wear out due to changes in their owner's needs or preferences; these can be reused by selling or giving them to new owners. Regiving can take place informally between family, friends, or neighbours, through environmental freecycling organisations or through anti-poverty charities such as the Red Cross, United Way, Salvation Army, and Goodwill which give these items to those who could not afford them new. Other organizations such as iLoveSchool

have websites where both new and used goods can be offered to any of America's school teachers so their life can be extended and help schoolchildren. The average American, for example, throws away 67.9 pounds[11] of used clothing and rags. With the U.S. population at approximately 296 million people, that translates into 20 billion pounds of used clothing and textiles that are tossed into the landfills each year. This has partly motivated movements such as The Compact, whose members promise not to buy anything new for a year, and rely on reusing items that otherwise would be thrown away. Reuse not only reduces landfill inline with the waste minimization program but can help raise money for a good cause.

PRINTER CARTRIDGES AND TONERS

Printer ink cartridges can be reused. They are sorted by brand and model, to be refilled or resold back to the manufacturers. The companies then refill the ink reservoir to resell to consumers. Toner cartridges are recycled the same way as ink cartridges, using toner instead of ink. This method is highly efficient as there is no energy spent on melting and recreating the cartridges.

REPURPOSING

Plastic bottles (with LED lights) repurposed as a chandelier during Ramadan in the Muslim Quarter, Jerusalem

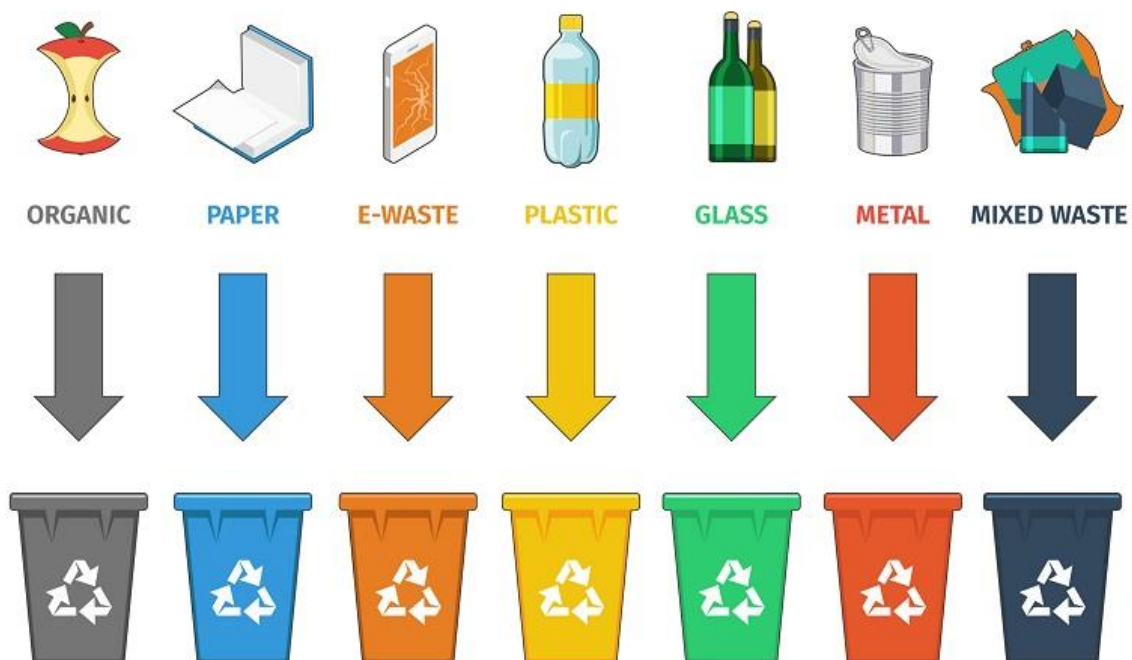
Repurposing is to use a tool for use as another tool, usually for a purpose unintended by the original tool-maker. Typically, repurposing is done using items usually considered to be junk or garbage. A good example of this would be the Earthship style of house, that uses tires as insulating walls and bottles as glass walls. Reuse is not limited to repeated uses for the same purpose. Examples of repurposing include using tires as boat fenders and steel drums or plastic drums as feeding troughs and/or composting bins.



WASTE EXCHANGES

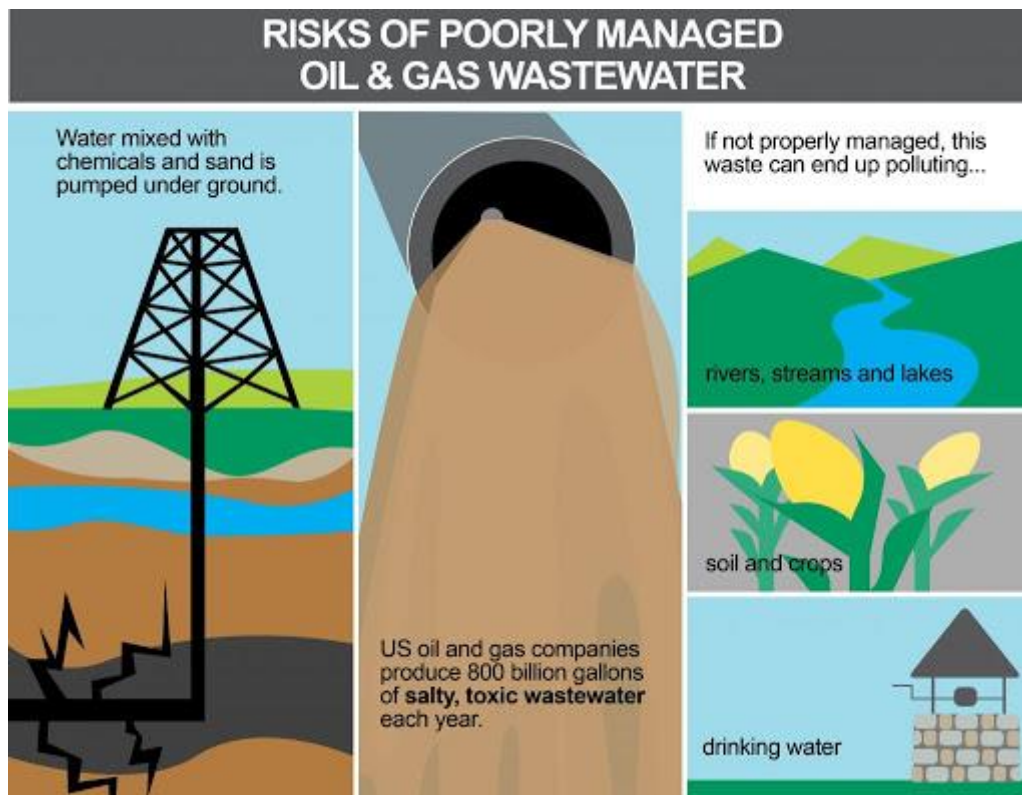
A helmet being reused, A waste exchange, or virtual exchange, facilitates the use of a waste product from one process as a raw material for another. As with new life reuse of finished items, this avoids the environmental costs of disposing of the waste and obtaining new raw material, and may still be possible if the nature of the process makes avoiding production of the waste or recycling it back into the original process impossible.

This sort of scheme needs to have a far broader base than is currently the case, it requires organization and the setting up of waste brokerages where lists of currently available wastes are and the quantities available. One of the problems is once a demand for a waste is known or shown then the material is no longer a “waste” but a sellable commodity which often prices itself out of the market, c.f waste cement kiln dust and N-viro (lime conditioned sewage sludge fertilizer). In the former East Germany, organic household waste was collected and used as fodder for pigs. This integrated system was made possible by the state's control of agriculture; the complexities of continuing it in a market economy after German reunification meant the system had to be discontinued.[citation needed]



REUSE OF WASTE WATER AND EXCRETA IN AGRICULTURE

The nutrients, i.e. nitrogen, phosphorus, potassium and micronutrients, and organic matter contained in wastewater, excreta (urine and feces) and greywater have traditionally been reused in agriculture in many countries and are still being reused in agriculture to this day - unfortunately often in an unregulated and unsafe manner. This is particularly a problem in many developing countries (e.g. Mexico, India, Bangladesh, Ghana) where untreated or poorly treated wastewater is used directly in agriculture. The WHO Guidelines from 2006 have set up a framework how this reuse can be done safely by following a multiple barrier approach. Work by the International Water Management Institute has led to a better understanding on how such wastewater reuse can be safely implemented in practice, for which they won the Stockholm Water Prize in 2012. Reuse of sanitised excreta in agriculture has also been called a "closing the loop" approach for sanitation and agriculture and is central to the ecological sanitation approach.



REDUCING WASTE SO THAT WILL HELP OUR ENVIRONMENT:

1. Take small portions of food and go back for "seconds" if you are still hungry. Put leftover food in reusable storage containers to eat later.
2. Buy or make up your own "picnic basket" that includes reusable cups, plates, and silverware. Look for these items at garage sales.
3. Save your old clothes for a garage sale or give them to a charity. If they are ripped or torn and cannot be repaired, then use them for cleaning rags (cut off and save the buttons first).
4. After you buy a small item, take it home in your pocket. You do not really need a bag. If your items are too large for your pocket, then bring a reusable shopping bag.
5. Use a hand towel for drying your hands and dish cloth or sponge for wiping up spills. They can be cleaned and used again instead of being used once and thrown away.
6. Buy in bulk or buy larger packages and put the amount you need for school or snacks in reusable containers. Buying in bulk is usually cheaper than buying individually wrapped servings and requires less packaging.

METHODOLY

RECYCLING

1. POORLY TRAINED/MANAGED EMPLOYEES

This is a common issue. Most recycling operations are affected sooner or later by poorly trained, under-motivated work staff. The fact is, many of these people have never been properly managed, and don't understand the expectations or even the basics of their job. That's why a reputable labor team supplier should always clearly explain job expectations and then actually manage workers. Employees are going to be happy because that's what they really want, so that they can do a good job, and keep their job.

2. EMPLOYEE RETENTION

You know the feeling—you come in to work wondering how many employees won't show up that day—and how that will ultimately affect your productivity. You feel like you're always playing "catch-up." To hold on to good people you need to go back to #1—training and managing employees the right way from day one. They also need hope, and that's why it benefits you to promote from within.

3. EXCESSIVE DOWNTIME.

This can definitely sap your productivity—and employee morale. That's why each employee should be accountable for their time. They should be ready to go to work, not just punching their timecard, when the machinery is first turned on. Simple procedural changes such as minimizing lengthy phone calls, long lunch breaks and unexplained absences can give you back hours of productive time that were previously lost.

4. OVERCOMING LANGUAGE/CULTURAL ISSUES

Different cultures speaking multiple languages—that's the reality of today's world. Smart workforce suppliers often actively recruit people from throughout the world. They may need to may need to have operations managers who can speak their language. However, this extra effort ultimately pays off with hard working employees.

5. RECRUITING EMPLOYEES IN AREAS WITH LOW UNEMPLOYMENT

With today's national unemployment rate hovering around 5%, it's a real challenge to fill all of your available openings. Labor team leaders often do much of the hiring at the actual worksite, not a storefront. This allows prospects to see the setup firsthand and find out if it's right for them. Another smart solution: recruiting backup pools to fill available openings as soon as they become available. It will help the people around there to gain the opportunity of having an income and to help their family live a better life.

6. LACK OF INDUSTRY EXPERTISE

Nothing beats specific hands-on waste/recycling industry experience. It begins with the equipment. Operations managers need to know how machinery works and how to keep it running. Sometimes a quick fix is all it takes. People skills are equally important. A strong operations manager has to have the respect of the workforce and deal effectively with people with personal and work-related challenges.

7. POOR OR NONEXISTENT PROCESSES

This is another big industry issue. Without consistent processes, your operation is going to be an under-performer. Look for workforce providers that offer process-driven expertise which streamlines the hiring, on-boarding, training, development and performance measurement of each employee. This lets you focus on the “big picture” issues that will drive your success.

8. PROPER EMPLOYEE PLACEMENT

It sounds simple, but just having employees at the right spot on the line can make a major difference in your productivity. A seasoned manager will observe the speed of the conveyor belt, quality of the recyclables, and the number of available people. There are many variables involved, and operations managers with specific waste/recycling industry experience are best equipped to maximize employee performance.

9. OVERCOMING POOR-QUALITY RECYCLABLES

Recyclable quality depends largely on geographic location. For example, Seattle and the rest of the Pacific Northwest is ecologically conscious and the quality of their recyclable materials is generally very high. The quality elsewhere in the country can vary greatly. These days you’ll see just about everything moving down the line, including the kitchen sink. Some of these items (especially garden hoses) can actually get wrapped around equipment and cause real damage. Having knowledgeable onsite operations managers and well trained employees will help you maintain productivity even when the quality of recyclables is low.

10. IMPROVING SAFETY PERFORMANCE

There are significant safety challenges facing the waste/recycling industry. They include chemical exposure, combustible dust explosions, machine guarding hazards, and exposure to powerful equipment with moving parts. Industry leaders always offer a proactive safety approach which begins with an intensive safety compliance audit at every plant and extends to rigorous safety training for all employees to get safety levels up where they need to be.

REUSE:

According to an article in Forbes, “There’s gold in them thar’ hills — except not nearly as much as in all the computers, cellphones and sundry electronic equipment we make and then discard.” Every year, approximately \$21 billion in gold and silver is used in the manufacturing of new electronic devices, reported VentureBeat, and that adds up to 320 tons of gold and 7.5 tons of silver. (Mercury is not a valuable metal, but it’s extremely toxic in the environment and recyclers do a great service by removing it from electronics.)

Of course, there’s not a great deal of precious metal in each device — 24 milligrams of gold in an average headset, the United Nations reports — but the sheer volume makes it potentially lucrative. Each year, Americans abandon 152 million mobile phones, 52 million computers and 36 million monitors. Those numbers will grow. Tablet sales are expected to reach 276 million units globally in 2017 (up from 19 million in 2010). By 2017, there will be more than 2.5 billion smartphone users around the world.

But as the volume of e-waste continues to grow, the value of gold, silver and other commodities has been dropping rapidly. In 2015, a major electronics recycler, Minnesota-based Materials Processing Corp., closed down, beset by a range of problems, the worst of which was the impossibly low profit margins from the resale of the copper, nickel, gold, silver, cobalt, platinum and other materials in the devices that were being dismantled.

The commodity price issue is a major one for “urban miners” that want to recover precious metal value from used electronics. And the problem is hurting waste recovery overall. Resource Recycling reported in 2015, “America’s largest publicly traded waste management companies indicate recycled commodity pricing is causing significant losses.”

At the 2016 International Electronics Recycling Congress in Austria, commodity prices were front and center. Thierry Van Kerckhoven, global sales manager at Umicore, said low prices are causing major problems for electronics recyclers, and have forced some to shut down in both the U.S. and Europe.

“Commodity prices will continue to be under pressure in the foreseeable future,” said the conference’s keynote speaker, Steve Skurnac, president of Sims Recycling Solutions. The situation calls for creative thinking, including partnering with big electronics producers. “Recycling companies that provide additional services and work together with manufacturers,” Skurnac said, “will be able to provide valuable services within the overall supply chain.”

Manufacturers play Key Role

Manufacturers may delight their customers by making devices ever thinner and more stylish, but recyclers see the new products as a challenge. For one thing, “There’s less precious metals like gold in components today,” said John Lingelbach, executive director of Sustainable Electronics Recycling International.

And Wired magazine pointed out in 2014 that, in some ways, computers before 2005 were more likely to be designed and manufactured for disassembly than they are today. The challenges today, the magazine said, include multiple colors and styles, ultra-thin profiles, cases without seams, glue in place of screws and big glass displays.

Some manufacturers produce products that are notoriously difficult to recycle, said John Shegerian, chairman and CEO of Electronic Recyclers International (ERI), which has recycled more than a billion pounds of material since 2005. But some companies are getting better at making their computers or other devices easily recyclable, he explained, a process that can include visiting ERI’s facilities to see the “pain points.”

One such company is Dell, which won the 2014 Institute for Scrap Recycling Industries “Design for Recycling Award” with its Latitude 10, Latitude E7240 notebook and XPS 10 tablet. In 2015, LG won for advanced televisions that are designed for dismantling “during every lifecycle phase.”

In addition to designing products for eventual recycling, some manufacturers — including Dell, Xerox, Samsung, LG, Panasonic and Sony — are also working closely with recyclers to take back their products when consumers no longer want them. Apple also has a recycling program, but is not very forthcoming about how it works.

According to MacWorld, “This lack of transparency makes it difficult to assess Apple’s e-waste operation.” Jim Puckett, founder of the Basel Action Network, told the magazine, “It’s very difficult to track, and you almost have to have internal knowledge of what [Apple’s] operations are. If we knew which recyclers they use, if they could tell us that, then we could find out where the [e-waste] is going.”

Choosing a recycling partner isn’t a casual process for these electronics companies.

“Manufacturers are very concerned about which recycler they use,” said Scott Cassel, CEO and founder of the Product Stewardship Institute. “The last thing they want is their products being mismanaged and ending up in the media, reflecting badly back on the company.”

Retailers Are Helping Recyclers certified by either R2 or e-Stewards (or both, as in ERI’s case) are also working with retailers that have set up take-back programs. Online super-seller Amazon has only very limited recycling programs, but Best Buy, Staples, Office Depot and Office Max have stepped up.

Amazon, which does have a mail-in recycling program for the Kindle book reader, received an “F” for its overall efforts from the Electronics TakeBack Coalition. Best Buy received a “B,” and Staples a “B+.”

Best Buy admits its program doesn’t break even, prompting British newspaper the Guardian to note that “Best Buy is collecting trash generated by Amazon, Walmart and other competitors” and sacrificing financially in the process. A sign of that economic pressure came in early 2016, when Best Buy said it would start charging \$25 to recycle TVs and computer monitors. Everything else, including printers, ink cartridges and computers, the company will still take back at its stores free of charge.

According to Best Buy’s Laura Bishop, a sustainability spokesperson, “E-waste volume is rising, commodity prices are falling and global outlets for recycled glass, a key component of TVs and monitors, have dramatically declined.” She added, “Best Buy should not be the sole e-cycling provider in any given area, nor should we assume the entire cost.”

Best Buy's program is changing, but it's still important. Cassel said Best Buy "collects more than any other manufacturer-sponsored program, providing a convenience to consumers unsurpassed by other locations."

Not all recycling happens at major retailers, though. A lot is done on the grassroots level, without big company involvement. For instance, at the University of Pennsylvania, a drive to collect unwanted devices that was part of reThink Your Footprint 2015 — with six convenient drop-off stations — yielded 5.6 tons of material. "Universities should be leaders in this area, because we certainly buy our share of electronics," said Dan Garofalo, the university's sustainability director. After a solid waste awareness campaign, he said, "We're seeing incredible participation."

Reuse: A Potent Force

At ERI, the process of evaluating a phone or other device for potential reuse is done on a human scale. (Other activities, mainly the shredding process and glass cleaning and separation processes, are mechanized.) Workers test the units, repair them when needed, wipe the data and repackage them. Only if it can't be resold does a device get stripped down to its component parts.

While individuals may no longer want their old phones, that doesn't mean these devices have reached the end of their useful lives. A New York-based startup called Placemeter, for instance, will pay up to \$50 a month to phone owners who set their old units to provide video feeds of busy intersections. And Bemo takes your redundant Android or iOS devices and uses it as the brains of a smart thermostat and energy management center.

The Ann Arbor, Michigan-based company Recellular, founded in 1991, showed the potential of donated cell phones by processing (and repairing) 500,000 of them a month at its peak. Half of the rebuilt phones went to domestic resellers, and half went abroad — to Africa, South America and Asia. In 2009, the company took in five million phones, and diverted 1.6 million pounds of solid waste (more than 600,000 pounds of it hazardous) from landfills.

But as with all forms of recycled electronics, the business can be cyclical and volatile. Recellular won awards, but it was hit with layoffs and then filed for bankruptcy in 2013. One problem was the increasing complexity of smartphones, which proved harder to deal with than simple call-and-text-only units.

Even without Recellular, at one time the largest player, the reuse market is thriving through resellers like Tradeups.com, SellMyCellPhones.com, EcoATM (which operates kiosks for reusable electronics), Gazelle.com, uSell.com and many others. Some major retailers such as Best Buy also buy old phones. And, of course, like all other electronic products, they can be auctioned on eBay or sold on Craigslist.

“Cellphones are currently one of the few electronic products, if not the only one, that also have a thriving reuse market,” wrote Roland Geyer of the University of California, Santa Barbara in an academic paper, titled “The Economics of Cell Phone Reuse and Recycling.”

According to Gartner in 2015, consumers upgraded their phones every 18 to 20 months, and almost two-thirds of those replaced units are being reused. That percentage could grow, as more and more phones are privately bought and owned. “The worldwide market for refurbished phones that are sold to end users will grow to 120 million units by 2017, with an equivalent wholesale revenue of around \$14 billion,” Gartner said. “This is up from 56 million units in 2014, with an equivalent wholesale revenue of \$7 billion. Many users are attracted to used, high-end devices that they would not have been able to purchase at the original selling price.”

There are sound economic reasons for refurbishing and reselling old phones. According to Ifixit.org, recyclers get just 50 cents for the materials in a phone, but resellers average \$20 per unit.

The reuse challenge gets bigger as the waste pile grows. Anu Vedantham, director of the Weigle Information Commons at the University of Pennsylvania, delivered an e-waste talk on the campus last year, and said the issue can be daunting. “Disposal of electronics can be trickier than other forms of waste,” she explained. “At Penn, we try to donate unwanted equipment to nonprofits, but it can be complicated for privacy reasons and because of the toxic materials in the devices.”

Vedantham cites the “hype cycle” in which “new technology comes out, and everyone rushes to buy it. But expectations can lead to disillusionment, and it encourages wasteful behavior. The result is likely to be 10 old phones in the kitchen drawer, and a growing e-waste problem.” One solution from a Penn library: 35 iPads faculty can borrow for classroom use.

The Data Challenge

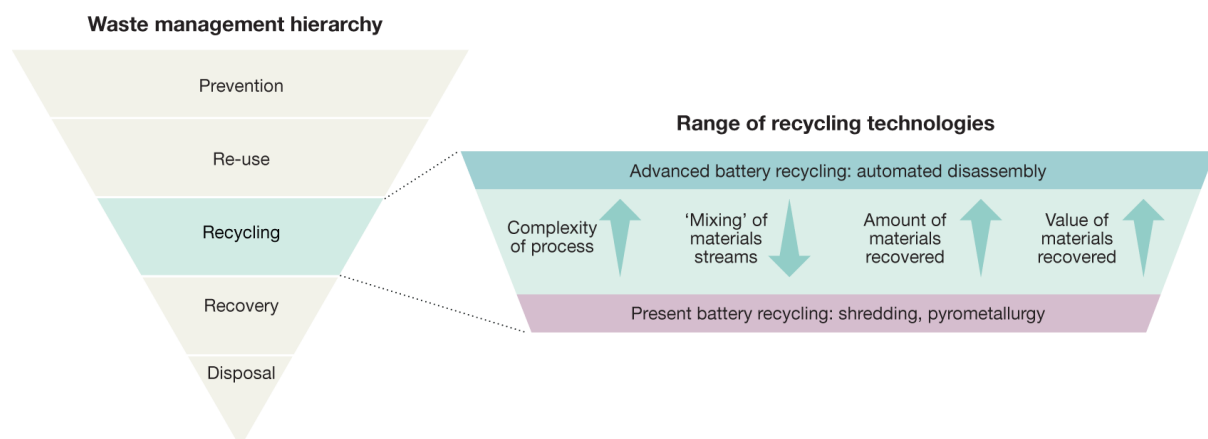
One major caveat in reselling used telephones, computers and other units that store information is data security. “It’s a serious problem,” said Allen Hershkowitz, who worked on electronics recycling at the Natural Resources Defense Council. “The data is out there for people to scavenge.”

In one frightening incident from 2006, some 230 Idaho Power hard drives were sold on eBay without having their data scrubbed. In an extraordinary effort, the company recovered 146 of them from the vendors, and got assurances from some of the eBay buyers. It’s not surprising such things happen — companies often use third-party vendors to get rid of unwanted equipment without a thorough background check on how data is handled.

All Green Recycling, with clients such as Homeland Security and the FBI, pointed out, “If data destruction and security isn’t handled with the care it deserves, it can lead to millions of dollars in damages and a permanently tarnished reputation.”

“Everyone is security-minded now; they don’t want their data breached,” said Shegerian, which is why ERI wipes all devices that are being refurbished or used for parts seven to 10 times, in accordance with the U.S. Department of Defense standards. All other devices go through the company’s enormous shredder, which is capable of handling over 30,000 pounds of e-waste per hour. And every device is tracked, using proprietary ERI software, throughout the recycling process, so that customers such as Best Buy, Staples and Dell can track their devices to confirm a clean wipe.

With so many of the devices we use going literally to waste, ERI’s Shegerian pointed out, “The opportunity for recyclers is massive.” But given today’s low commodity prices, changing product design and data concerns, he added, “It’s also very labor-intensive and a very hard business to succeed in.”



BIG DATA COMPLEXITY AND THE NEED FOR DATA REDUCTION

Big data systems include social media data aggregators, industrial sensor networks, scientific experimental systems, connected health, and several other application areas. The data collection from large-scale local and remote sensing devices and networks, Internet-enabled data streams, and/or devices, systems, and networks-logs brings massively heterogeneous, multi-source, multi-format, aggregated, and continuous big data streams. Effectively handling the big data stream to store, index, and query the data sources for lateral data processing is among the key challenges being addressed by researchers. However, data scientists are facing data deluge issue to uncover the maximum knowledge patterns at fine-grained level for effective and personalized utilization of big data systems. The data deluge is due to 6Vs properties of big data, namely the volume, variety, value, velocity, veracity, and variability. The authors in [1] discussed the 6Vs as follows.

- *Volume* The data size characterizes the volume of big data. However, there is no agreed upon definition of big data which specifies the amount of data to be considered as ‘big’ in order to meet the definition of big data. However, a common sense is developed in research community who consider any data size as big in terms of volume which is not easily processable by underlying computing systems. For example, a large distributed system such as computing clusters- or cloud-based data centers may offer to process multiple terabytes of data but a standalone computer or resource constrained mobile devices may not offer the computational power to process even a few gigabytes of data. Therefore, the volume property of big data varies according to underlying computing systems.
- *Velocity* The velocity of big data is determined by the frequency of data streams which are entering in big data systems. The velocity is handled by big data systems in two ways. First, the whole data streams are collected in centralized systems, and then, further data processing is performed. In the second approach, the data streams are processed immediately after data collection before storing in big data systems. The second approach is more practical; however, it requires a lot of programming efforts and computational resources in order to reduce and filter the data streams before entering in big data systems.

- *Variety* Big data systems collect data stream from multiple data sources which produce data streams in multiple formats. This heterogeneity in data sources and data types impacts the variety property-related characteristics. Therefore, big data systems must be able to process multiple types of data stream in order to effectively uncover hidden knowledge patterns.
- *Veracity* The utility of big data systems increases when the data streams are collected from reliable and trustworthy sources. In addition, the data stream collection is performed with compromising the quality of data streams. The veracity property of big data relates to reliability and trustworthiness of big data systems.
- *Variability* Since all data sources in big data systems do not generate the data streams with same speed and same quality. Therefore, variability property enables to handle the relevant issues. For example, the elastic resource provisioning as per the requirements of big data systems.
- *Value* The value property of big data defines the utility, usability, and usefulness of big data systems. This property tends more toward the outcomes of data analytics and data processing processes and is directly proportional to other 5Vs in big data systems.

FINDINGS

Nine-tenths of all solid waste in the United States does not get recycled.

Landfills are among the biggest contributors to soil pollution – roughly 80% of the items buried in landfills could be recycled.

Although 75% of America’s waste is recyclable, we only recycle around 30% of it. Turns out, there are a few easy steps you can take to start recycling better.

A single recycled plastic bottle saves enough energy to run a 100-watt bulb for 4 hours. It also creates 20% less air pollution and 50% less water pollution than would be created when making a new bottle.

Recycling plastic saves twice as much energy as it takes to burn it.

It only takes 5 recycled plastic bottles to make enough fiberfill to stuff a ski jacket.

Motor oil never wears out, it just gets dirty – and it can be recycled.

The U.S. recycling rate is around 34.5%. If we're able to get the rate to 75%, the effect will be like removing 50 million passenger cars from U.S. roads.

Over 11 million tons of recyclable clothing, shoes, and textiles make their way into landfills each year.

The leading cities for recycling in the US are (#1) San Francisco, CA (#2) Boston, MA (#3) Chicago, IL (#4) Denver, CO and (#5) Portland, OR.

The leading countries for recycling rates are: (#1) Switzerland [52%] (#2) Australia [49.7%] (#3) Germany [48%] (#4) Netherlands [46%] and (#5) Norway [40%]. The United States comes in around 31.5%.

9 out of 10 people said they would recycle if it were "easier".

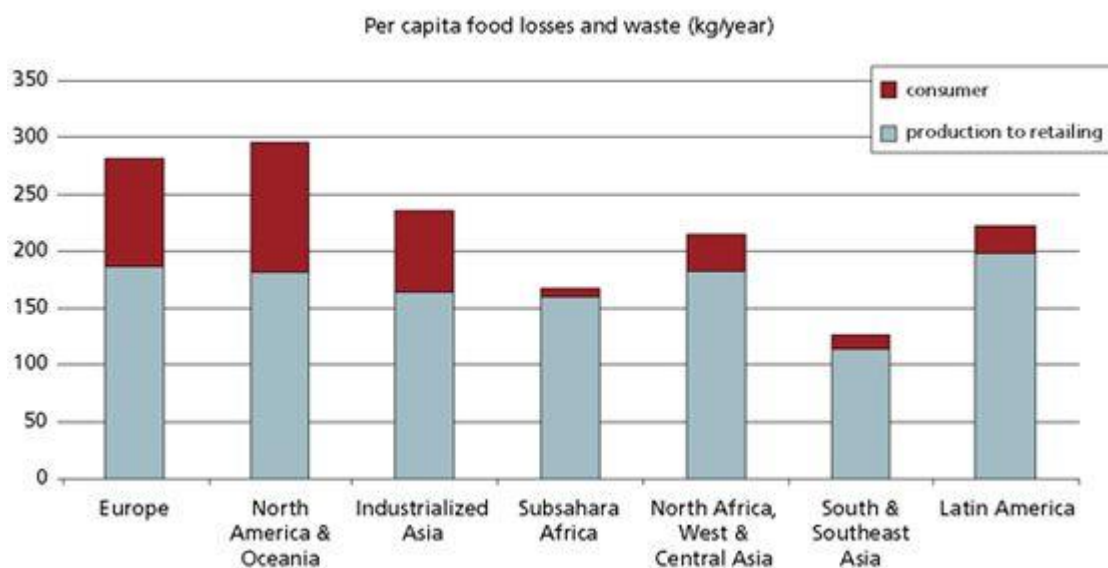
Studies indicate that women on average typically express more concern for the environment and are more likely to recycle than men.

The United States throws away \$11.4 billion worth of recyclable containers and packaging every year.

GLOBAL REDUCTION FINDINGS:

Accurate estimations of the magnitude of losses and waste are lacking, particularly in developing countries. Nevertheless, there is no doubt that food loss and waste remain unacceptably high. Studies commissioned by FAO estimated yearly global food loss and waste by quantity at roughly 30 percent of cereals, 40–50 percent of root crops, fruits and vegetables, 20 percent of oilseeds, meat and dairy products, and 35 percent of fish. Food loss and waste are heavily dependent on the specific conditions and local situation in a given country or culture. In low-income countries food loss results from wide-ranging managerial and technical limitations in harvesting techniques, storage, transportation, processing, cooling facilities, infrastructure, packaging and marketing systems. The main sectors of concern are small- and medium-scale fisheries, agricultural production and processing. Social and cultural conditions – such as the different productive and social roles that men and women play at different stages of the value chain – are also often underlying causes of food loss. In rural settings, while women are often the main actors in agriculture, post-harvest handling and marketing, social barriers may block their involvement in other stages of the chain. The difficulties that women face in obtaining access to and benefits from resources, services, jobs

and income-generating activities affect their productivity and efficiency in food production, and can lead to food loss. The causes of food waste in medium- and high-income countries relate mainly to consumer behaviour and the policies and regulations put in place to address other sectorial priorities. For example, agricultural subsidies may contribute to the production of surplus quantities of farm crops, of which at least a proportion is lost or wasted. Food safety and quality standards can be applied in ways that remove food that is still safe for human consumption from the food supply chain. At the consumer level, inadequate planning of purchases and failure to use food before its expiry date also lead to avoidable food waste.



Plastic Facts

In the United States, we throw away 2.5 million plastic bottles every hour – about 42,000 per minute, or about 695 per second. But there's an easy way to reduce your plastic use.

It takes 500 years for average sized plastic water bottles to fully decompose.

The amount of plastic film and wrap produced annually could shrink-wrap the state of Texas.

The energy it takes to make 1.5 million tons of plastic could power 250,000 homes.

There are 25 trillion pieces of plastic debris in the ocean. Of that, 269,000 tons float on the surface, while some four billion plastic microfibers per square kilometer litter the deep sea.

According to a study done by the University of Georgia, 18 billion pounds of plastic trash winds up in our oceans each year. To put that in perspective, it's enough trash to cover every

foot of coastline around the world with five full trash bags of plastic...compounding every year.

Plastics cause more than 80% of the negative effects on animals associated with ocean trash.

Over 100,000 marine animals die every year from plastic entanglement and ingestion.

Glass Facts

Glass bottles take 4,000 years to decompose.

Glass, like aluminum, is infinitely recyclable – without any loss in purity or quality.

Glass bottles have been reduced in weight by approximately 40% over the past 30 years.

Recycled glass is substituted for up to 95% of raw materials.

An estimated 80% of all glass containers recovered for recycling are re-melted in furnaces and used to manufacture of new glass containers.

Glass container manufacturers hope to achieve 50 percent recycled content in the manufacture of new glass bottles. This achievement would save enough energy to power 21,978 homes for one year and while removing over 181 tons of waste from landfills monthly.

Aluminum Facts

Americans use 65 billion aluminum soda cans each year.

In only three months, enough aluminum cans are thrown out in the United States to rebuild all of our commercial air fleets.

Aluminum cans make up less than 1% of waste in the United States because they are #1 recycled

There is no limit to the number of times you can recycle an aluminum can.

After recycling, an aluminum can is usually repurposed within 60 days.

Recycling just two aluminum cans save the same amount of energy it takes to power a PC for a single workday.

You can make 20 new cans from recycled material using the same amount of energy that it takes to make 1 brand new can.

Paper Facts

While the United States celebrates the holidays, Americans produce an additional 5 million tons of waste (four million of the 5 million tons consisting of wrapping paper and shopping bags).

The majority of the 4 million tons of junk mail that Americans receive annually ends up in landfills.

The energy used to create and distribute junk mail in the US for one day could heat 250,000 homes.

On average, Americans use 650 pounds of paper a year. Each.

U.S. businesses use around 21 million tons of paper every year.

The United States throws out the amount of office paper it would take to build a 12-foot wall from Los Angeles to New York City (2,794 miles).

Americans make nearly 400 billion photocopies a year, which comes out to 750,000 copies every minute.

The average office worker in the United States goes through roughly 500 disposable cups annually.

Making new paper from recycled materials uses less energy than producing paper from virgin tree products and leaves more trees to absorb excess carbon dioxide.

For every 1 ton of paper that's produced, roughly 390 gallons of oil is used to make it.

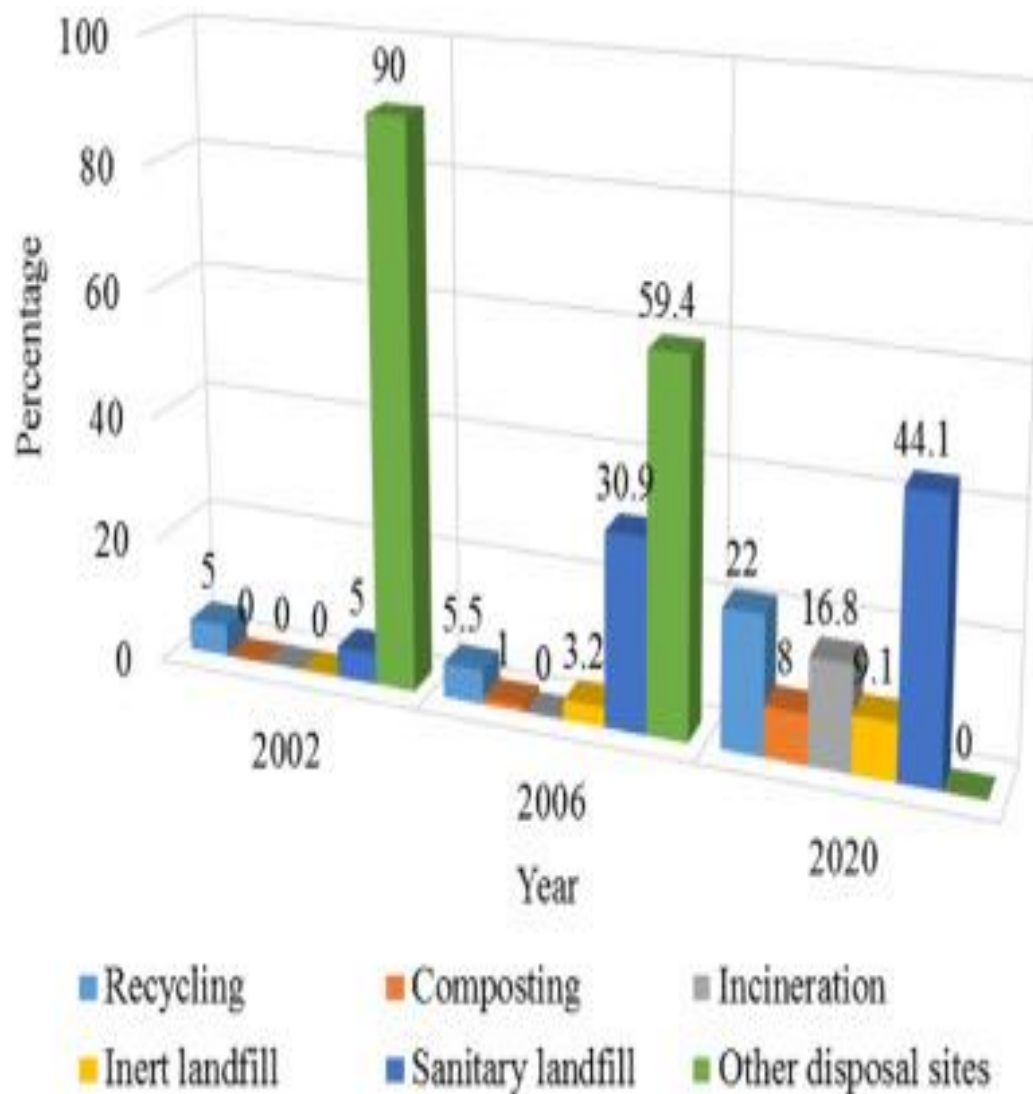
1 trillion pages of paper equal 8.5 million acres of trees. That is an area greater than the state of Maryland.

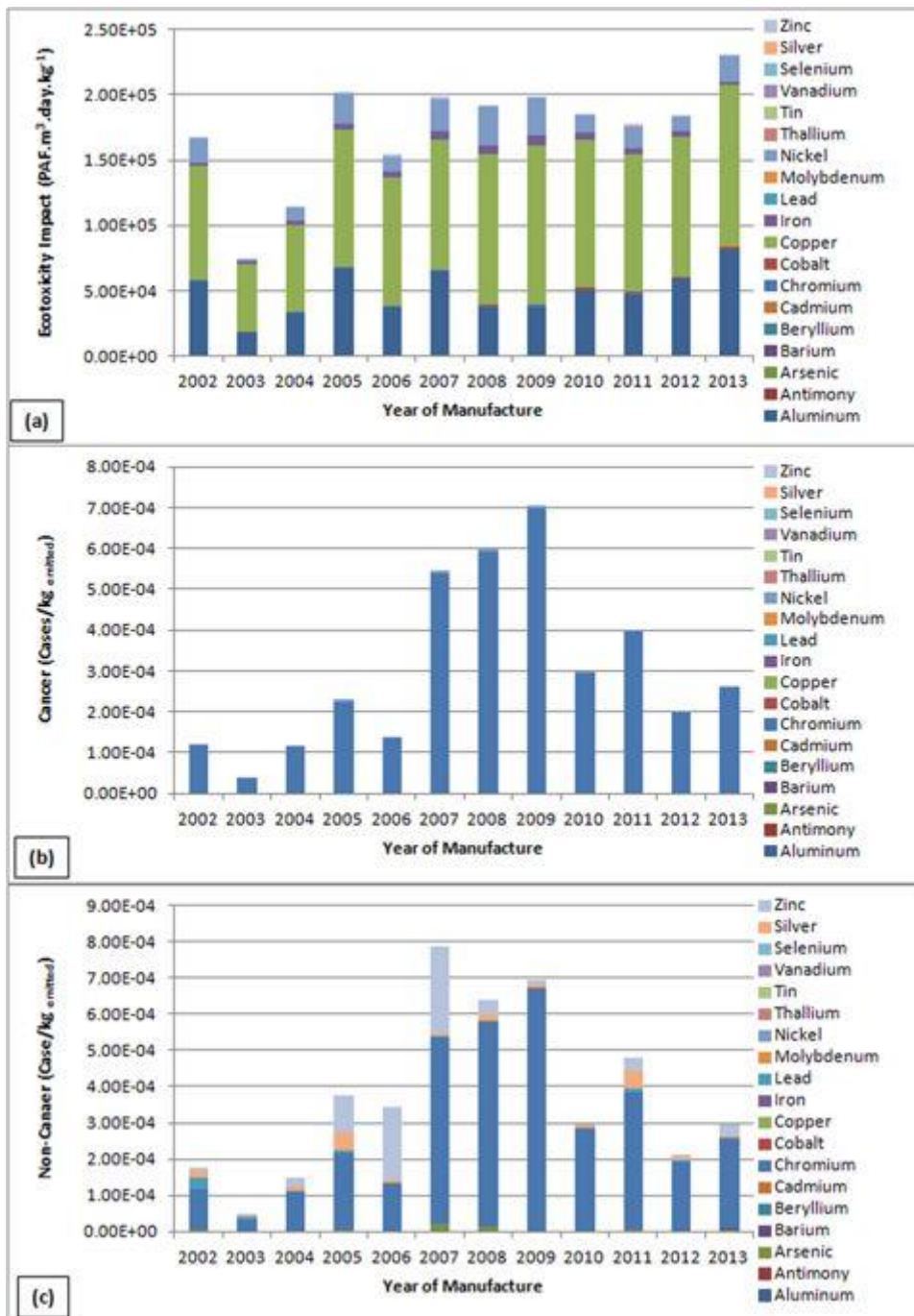
2,000 pounds (or 1 ton) of recycled paper helps to save over 350 gallons of oil, 17 trees, and a large portion of landfill space.

A single American consumes roughly two trees annually in paper products.

Of the 62 million newspapers printed daily in the United States, 44 million will be thrown away (roughly 500,000 trees).

If 1/10 of all discarded American newspapers were recycled annually, approximately 25 million trees would be saved





Even though it's incredibly easy to recycle household goods, many people still fail to separate their waste into recyclables and non-recyclables. Sometimes, the best way to motivate people to recycle is by teaching them more about why it's important to do so and the efforts being made by millions of people around the world. Here's a look at some surprising recycling statistics that you should share with non-recyclers in your life:

Waste reduction:

Waste reduction is likely to have other consequences; which may be just as significant. Worker productivity may increase as a result of a particular waste reduction action; while product quality might decrease as a result of another action. There are [costs](#), [benefits](#), and site-specific constraints to waste reduction which cannot be totally predicted. The [feasibility](#) of waste reduction is in the entire production system within which it takes place. Waste reduction activities are very open-ended and very difficult to assess comprehensively. Certain activities often related to technology use and assessment and are not easily undertaken for waste reduction. Included are:

- forecasting, how much waste reduction is feasible;suggesting how government might require companies to achieve a given level of waste reduction.

How much waste reduction is achievable depends on how much *attention* is given to it and on the amount of waste reduction technology available. Success in reducing waste starts with human factors and requires an examination of opportunities.



Four Pounds of Trash Per Day

Many people think they won't make much of a difference by recycling since they're only one person, but that's certainly not the case. It's estimated that the average individual creates around 4 pounds of trash per day, which adds up to nearly 1,500 pounds of trash per year. Clearly, one person can make a difference by choosing to recycle.

Only 30% of the Waste Stream is Recycled

The Environmental Protection Agency (EPA) estimates that about 75% of the waste stream generated by people in the U.S. is recyclable. But unfortunately, only about 30% of the waste stream is actually recycled. This means a lot of waste that could be recycled is ending up in landfills simply because people are not taking the time to separate their waste.

2.5 Million Plastic Bottles Per Hour

People in the U.S. throw away about 2.5 million plastic bottles every hour instead of recycling them. Every plastic bottle that ends up in a landfill will stay there for quite a while. In fact, it takes hundreds of years for a single plastic bottle to decompose. This is one of the many reasons why landfill space is so limited.

Seven Trees A Year

The average individual in the U.S. uses enough paper and wood to account for seven trees per year. Even though paper products are recyclable, many of them are sent to landfills. If more people pitched in to recycle their paper products, the U.S. could save millions of trees every year. In fact, it's estimated that 25 million trees would be saved if everyone in the U.S. simply recycled one-tenth of their newspapers.

Pieces of Plastic in the Oceans

Much of the plastic waste that is generated here in the U.S. ends up in the oceans if it is not properly recycled. There are over 45,000 pieces of plastic per every square mile of the ocean. Even though you may not see it, it's there, and it's a growing problem that needs to be addressed. Not only is this plastic polluting the oceans, but it's also killing marine life and seabirds.

Recycling One Aluminum Can

Tossing one aluminum can in a recycling bin takes a matter of seconds, but it can save a great deal of energy. As a matter of fact, it's estimated that recycling a single aluminum can will save enough energy to power a TV for up to three hours.

These statistics show the severity of the problem and the importance of recycling. Share them with your loved ones so you can send them a friendly reminder to do their part and recycle!

DISCUSSION

A draft policy aims to bring in efficiency in the use of materials drawn from the natural environment for various industries, by focusing on a reuse and recycle philosophy.

India's resource extraction rate is more than three times than the global average and the proposed policy aims to take forward an environment and development balance.

The draft National Resource Efficiency Policy 2019 proposed by the environment ministry outlines a three-year resource management action plan across seven sectors which contribute to about 25 percent of India's income.

It proposes a series of measures for better waste management and reduced landfill use, better management of construction waste, electronic waste and waste from other growing sectors.

By 2025, India will have more than 21 million vehicles that have reached the end of their useful life, according to an estimate by the Central Pollution Control Board (CPCB). More than 8.7 million vehicles had reached the end-of-life vehicle status in 2015. At present, these vehicles usually end up at the unorganised dismantling centres for extracting functioning spare parts.

In a new draft policy, India's environment ministry has proposed a higher focus on recycling in the automobile sector, among other sectors, with a target of 75 percent to 90 percent recycling rate for vehicles, depending on the year of manufacture. The draft also seeks establishment of 20 official vehicle dismantlers across major urban centres by 2020.

With India's resource extraction (withdrawing materials from the natural environment) reported to be more than three times the world average, the Ministry of Environment, Forest and Climate Change (MoEFCC) has proposed a National Resource Efficiency Policy (NREP) 2019 to increase the focus on recycling and reuse for resource efficiency.

The draft also proposes a three year action plan and implementation strategy across seven major sectors – automotive, plastic packaging, building and construction, electrical and electronic equipment, solar photovoltaic, steel and aluminium – which together contribute to one fourth of India's income. The ministry has sought views and suggestions on the draft of the policy within the next one month.

India extracts natural resources, primarily for use in its various industries, at the rate of 1,580 tonnes per acre. This is significantly higher than the world average of 450 tonnes per acre, according to the draft NREP policy. Thus the draft policy aims to implement efficiency in the use of all relevant resources including metals, minerals, fossil fuels, biomass, air, water, land, forests and across all life cycle stages starting from raw material extraction to end-of-life management.

Among the proposed measures in the policy, the draft said that “over time, it will be extremely important to move towards zero landfill” and for that, it will be important to disincentivise landfilling by “imposing landfill taxes” and “high tipping fees especially for bulk generators of waste”. It stressed that this would encourage the optimal use of the material and better waste management.

The need for such a policy is important as India's fast-growing economy is unsustainably consuming its resources, with the policy noting that India has increased its material consumption to six times, from 1.18 billion tonnes in 1970 to seven billion tonnes in 2015 and projected to be more than double of this by 2030, but that this “economic growth has been coupled with inherent cost on the natural environment.”

The draft policy stressed that India has low material productivity compared to the global average and a much lower recycling rate at 20-25 percent compared to rates as high as 70

percent in regions like Europe. Material productivity means the ratio of output achieved compared to the inputs (resources) used and low material productivity indicates that resources are not being used efficiently. India also withdraws the highest amount of water for agriculture, globally. Additionally, 30 percent of its land is undergoing degradation and there is a high import dependency of many critical raw materials.

“The projected pace of economic development is going to put pressure on already stressed and limited resources and may lead to serious resource depletion and environmental degradation affecting the economy, livelihoods and quality of life. Further, material use is also closely associated with the problem of increasing waste,” said the draft policy.

The policy said it wants to reduce “primary resource consumption to sustainable levels” in line with United Nations Sustainable Development Goals, create higher value with less material through resource-efficient and circular approaches and minimise waste creation.

Focus on recycling and reuse

The draft policy includes the first three-year action plan (2019 – 2022) for the seven sectors that are heavily dependent on imports of raw materials, which can be brought down by efficient use of resources..

For instance, for electronics sector, the import dependency of raw materials like silver is 75 percent, rare earth material (100 percent), gold (90 percent), platinum (95 percent) and Copper (50- 60 percent).

An auto scrapyard in the United States of America. Photo by IFCAR/Wikimedia Commons.

Among materials, the action plan also addresses the use of plastic, which has been on the national agenda for a while. At present, a majority of states in India have imposed some kind of a ban on plastic. CPCB recently told the National Green Tribunal (NGT) that 18 states across India have completely banned the use of plastic carry bags while in five other States there is a partial ban at some places.

The proposed plan calls for 100 percent recycling and reuse rate of PET plastic by 2025, 100 percent recycling of PET plastic and 75 percent recycling and reuse rate of other plastic packaging materials by 2030. It also suggested a ban on “disposal of recyclable waste (plastics, metals, glass, paper, cardboard and biodegradable waste) to landfills by 2022.”

The action plan also looked at ways to manage the waste from the building and construction sector that contributes to about nine percent of India's national income. It called for a 50 percent "recycling rate for construction and demolition waste by 2025 and 75 percent by 2030."

It is projected that over 40 percent of the population will be living in urban areas by 2030. For that, it is estimated that almost 70 percent of buildings that are supposed to exist by 2030 are yet to be built which reveals a huge upcoming demand for naturally extracted raw materials like sand, soil, stone and limestone (for cement).

India's annual consumption of sand is estimated at 750 million tonnes, of stones for making aggregates is two billion tonnes and limestone to make cement is 242 million tonnes. "A substantial share of the new demand can be met using the waste of the existing stock," noted the plan while setting a target that, by 2025, 30 percent of total public procurement of materials for civil construction comes from recycled materials.

Meanwhile, for the electrical and electronic equipment sector, the plan called for strengthening the compliance of the Extended Producer Responsibility (EPR) and introduce a "penal system in case of non-compliance and the financial resources thus collected can be used for providing access to recycling technologies to the informal sector". In 2016, India was the fifth largest producer of e-waste in the world and generated nearly two million metric tons of e-waste.

Ravi Agarwal, who is the founder-director of non-government organisation Toxics Link, said the government is looking at a national resource efficiency framework as part of the circular economy. "It will have major ramifications. It is not just going to be about the waste but also about energy, production and the whole circularity of material use," Agarwal told Mongabay-India.

Prevent the sunshine sector from eclipse

The proposed draft also addresses waste generated from the solar power sector, India's renewable energy pillar under which 100,000 megawatts of solar power is expected to be installed by 2022, which would result in a significant amount of waste as well.

The action plan observed that key materials used in solar panel manufacturing include silicon, glass, silver, aluminium and copper and the demand for these would increase with the growth in the sector. "Under an ambitious solar energy deployment scenario of nearly 170 gigawatts

by 2030, the total estimated demand for materials will increase from almost 0.7 million tonnes to 12 million tonnes between 2015 and 2030. Under this scenario demand for glass, aluminium, silver will reach seven million tonnes, 1.7 million tonnes and 3.8 million tonnes by 2030, as compared to 0.4 million tonnes of glass, 0.1 million tonnes of aluminium and 0.2 million tonnes of silver consumed in 2015 by the sector,” it said.

Electronic waste is emerging as a major waste management problem for Indian authorities.

Photo by Praveenp/Wikimedia Commons.

The plan called for setting up proper solar panel recycling infrastructure to manage large volumes of solar panels that will be disposed in the near future. It targeted that by 2025 four major authorised dismantling facilities are established and increased to eight by 2030.

Surbhi Singhvi of renewable energy consulting firm Bridge to India (BTI) welcomed the move.

“I think it is a great start for India. Globally, there are a few solar panel manufacturers who are reusing old panels at the end of their lifetime to make new ones. If something like this happens in India, it is a welcome step. On top of making recycling and reusing an integral part of the industry, the government should also have included a provision to ensure that environmentally non-hazardous raw materials are used in the manufacturing of solar equipment.” Singhvi told Mongabay-India.

“There are certain elements in solar panels that are not recyclable and are environmentally hazardous. The government should ensure that such elements are not used in the first place. It is a well-timed and a much-needed move by the government,” she said.

In the plan for the steel sector, an “imposition of import duty for scrap imports beyond certain limits to promote utilisation of domestic scrap” was proposed. It proposed a goal of zero import of steel scrap for recycled steel production by 2030. Similarly, for the aluminium sector, the action plan stressed that that there is heavy dependence on imported scrap and “increased availability of domestic scrap can be achieved through various economic instruments including export taxes, export quotas, and even export bans or punitive tax rate if recycler resorts to trade in scrap without processing or adding value.”

For this, it recommended goals of domestic scrap fulfilling to be 50 percent of the total aluminium scrap requirement by 2030 and increasing the recycling rate to 50 percent by 2025 and 90 percent by 2030.



CONCLUSION

In conclusion, we learned a lot of reasons why recycling is important in our community and especially at school. We learned about waste and how some waste can be reused or recycled into other products. I hope that this class will stick by their pledge to become students who are committed to recycling in school and out of school. And remember... keeping recyclable items inside the Recycling Loop keeps them out of the landfills and reduces pollution.

There is so much information about recycling. But high quality education is a must if the amount of recycling is to be increased. We must communicate one message if people are to understand the seriousness of the problem. Everyone should understand the subject thoroughly so that the only excuse can be a lack of interest. The problem of contamination of recycling bins must be overcome.

Research is of vital importance and must continue. For example, the recycling of films which are laminates of different plastics must continue to be investigated.

Together we must reduce, reuse and recycle. We can reduce by purchasing items with the least amount of packaging and buying in bulk when appropriate. We can reuse by avoiding disposable items. Finally we can recycle by using community recycling programs and purchasing products made from recycled materials.

Never before has there been a time when environmental issues such as recycling have been more relevant. We must stop refusing to look past today.

Waste separation from the household level, proper storage, more efficient waste collection systems, and sustainable recovery and disposal practices are identified as needed processes in the study area. Considering the nature and components of waste generated by households and business places, the waste reduction, reuse, recycling and composting processes would be more suitable in managing the challenge. These management options should be integrated in a sustainable framework. Adequate consideration should be given to monitoring processes. Public education and properly planned waste management programs also need to be introduced into the current waste management system. Especially awareness programmes must be conducted in order to improve the knowledge about the importance of SWM for sound environmental development in the area. The authorities should provide for the introduction of complimentary programs and policy development.

For solid waste: reuse/repurpose first and then recycle. Metals, glass, paper and plastic are now recyclable. Almost 100% of metals are recycled into consumer goods, with glass and paper a close second. Unfortunately only 38% of plastics are recycled. Like other fossil fuel products, we are still wasting them. Aluminum recycling saves 95% of the energy and 80% of the mining costs. This is important because we have to bury the trash that we produce with ever-increasing costs and loss of land. Recycling makes sense in all areas of our economy.

Waste water is treated in most modern cities. Don't put oil, medicines, chemicals and other persistent materials in your toilet/sink. Cooking oil solidifies in collection systems and eventually impede the flow of waste water, with very high costs for repairs.

Don't run internal combustion engines, especially diesel types, when not necessary. Keep your car running clean and don't idle for long periods of time.

These things are easy to accomplish and save us money individually and as a society.

MOST FAVORED OPTION

Reduce

Lowering the amount
of waste produced



Reuse

Using materials repeatedly



Recycle

Using materials to
make new products



Recovery

Recovering energy
from waste



Landfill

Safe disposal of
waste to landfill

LEAST FAVORED OPTION

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