

Incineration: The Biggest Obstacle to Zero Waste
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Ten Arguments Against Incineration

Argument 1: Incinerators Are Very Expensive

Incinerators remain formidably expensive, but that expense is often hidden from public view with giant public subsidies. To pay for the capital and operating costs, as well as the operators' profit margins, the community or region will have to sign put-or-pay agreements, which trap them for twenty-five years or more. As the industry has struggled to make incineration safe, it has priced itself out of the market – or it would have if the market was applied on a level playing field.

Over half the capital cost of an incinerator built today goes into air pollution control equipment. Ironically, if the waste were not burned in the first place this hugely expensive equipment would not be necessary, nor would the toxic ash collected in these devices have to be sent to an expensive hazardous waste landfill, nor would the air emissions be subjected to very costly monitoring. But the public is being kept ill informed about the poor economics of incineration. Instead, they are being told that incineration is going to save their communities money.

Argument 2: Incinerators Create Very Few Jobs

Despite the massive investment involved, incinerators create very few long-term jobs for the community. Most of the money spent on incinerators goes into purchasing complicated equipment and leaves the host community and often the host country as well. It's extraordinary that during the current economic crisis in Europe, with the massive cutbacks in many public service areas and the concurrent loss of jobs, many countries are still forging ahead with extremely costly, job-poor incinerator projects. However, there are many short-term jobs created in building these facilities and that is why they often attract local building union support.

One of Italy's most famous incinerators was built in Brescia. It cost about \$400 million to build and has received at least another \$600 million in energy subsidies. To my surprise, during a site visit to this incinerator, I was told that despite all the taxpayer money spent on this facility it had produced only eighty jobs. This is both economic and social madness – \$1 billion to produce just eighty jobs!

Compare that with Nova Scotia (population 900,000), which avoided building a massive incinerator in Halifax and has created one thousand jobs in the collection and treatment of the discarded materials in the province and another two thousand jobs in the industries that use these secondary materials. Or consider the fact that Recology – San Francisco's primary recycling, composting, and waste company – employs one thousand workers who are both unionized and employee owners of their company.

Argument 3: Incinerators Are a Waste of Energy

The argument that burning waste can be used to recover energy makes for good sales promotion, but the reality is that if saving energy is the goal, then more energy can be saved by

society as a whole by reusing objects and recycling materials than can be recovered by burning them. Unfortunately, this argument is often lost on local decision makers who focus on energy gained locally and ignore the net loss nationally or globally. A combination of recycling and composting saves three to four times more energy than generated by an incinerator producing electricity. Some of the comparisons for individual materials are staggering. For example, recycling polyethylene terephthalate (PET) plastic (commonly used in disposable water bottles) saves twenty-six times more energy than burning it.

Argument 4: Incinerators Are Inflexible

As a result of the huge expense incurred when communities build incinerators it greatly reduces their options for the future, no matter what developments and changes are happening elsewhere in the waste field. Such developments include the changing attitudes of the public toward recycling and sustainability and the changing value of the recovered materials themselves. Their market value is expected to greatly increase with the expanding economies of India, China, Brazil, and other countries with rapidly developing economies and huge populations.

As Ludwig Kraemer, former waste director for the European Union, said in an interview on the BBC news program Panorama in 2000, "An incinerator needs to be fed for about twenty to thirty years, and in order to be economic it needs an enormous input from quite a region. So for twenty to thirty years you stifle innovation, you stifle alternatives, just in order to feed that monster which you build."

Argument 5: Incinerators Produce a Toxic Ash and Do Not Get Rid of Landfills

Incinerators don't solve the landfill problem. About 25 percent by weight of the incoming waste is left as ash, and this still has to be landfilled. Promoters of incineration often describe the ash produced as "inert." What they mean by this is that it is biologically stable (most of the organics have been burned away), but what is often implied is that it is nontoxic, which is false. The end result is that incineration converts four tons of trash into at least one ton of toxic ash that nobody wants.

Ash is a catch-22 for the incineration industry. As the industry has sought better air pollution control devices to capture the extremely toxic by-products of combustion, the resulting residues have become more problematic and costly to handle, dispose of, and contain.

There are two kinds of ash generated by an incinerator: the bottom ash (about 90 percent of the ash), which falls through the grate system at the base of the furnace, and the fly ash—the very fine material entrained in the flue gas. Ideally, this fly ash is captured in the boilers, the heat exchangers, and the air pollution control devices; however, inevitably a small fraction escapes into the atmosphere. As far as toxic metals are concerned, it is a chemical truism to state that the better the air pollution control the more toxic the fly ash becomes. The bottom ash is also toxic.

In some places fly ash has been used to make concrete, but with no warning on the product label that it contains hazardous materials like toxic metals and dioxins.

If handled properly, ash makes incineration prohibitively expensive (especially when the bottom ash is found to be toxic) for all but the wealthiest communities. If handled improperly, it poses both short- and long-term health and environmental dangers.

Argument 6: Incinerators Produce Very Toxic Air Emissions

The pollutants incinerators emit include toxic metals, dioxins, and dioxin-related compounds. (These compounds can interfere with sexual and mental development in humans, and the immune system.) Some of these highly persistent or permanent toxins emerge in the form of nanoparticles.

There is no question that since the 1980s the incinerator industry has done a far better job at reducing dioxin emissions from well-designed, well-operated, and well-monitored incinerators – but that does not mean that all incinerators running today, or being proposed in the future, operate (or will operate) in this fashion on a routine basis. There is a world of difference between the theory and practice of incineration, and that difference can ruin the health and well-being of communities that host these facilities.

The public needs three things to be protected from toxic emissions: 1) strong regulations, 2) scientific monitoring, and 3) tough governmental enforcement of the regulations. If either monitoring or enforcement is weak, the public is not protected by strong regulations. For example, some of the strongest environmental regulations in the world were passed in the former Soviet Union, but that did not prevent horrendous pollution of its environment because these regulations were not enforced.

As far as the public is concerned the weak link for incinerators in the United States and many other countries is how infrequently toxic metal and dioxin air emissions are monitored. Incinerator promoters proudly talk about their continuous environmental monitoring (CEM) for their facilities. However, CEM is not possible for toxic metals (with the possible exception of mercury) and dioxin-related compounds. To monitor these requires inserting a probe into the flue gas and collecting a sample on filters. These filters then have to be sent to a laboratory for analysis, which can take several months. There are not many labs equipped with the very expensive equipment to do this testing or the subsequent analysis. Some countries considering incineration have no companies available to do this testing.

Argument 7: Incinerators Release Very Toxic Nanoparticles

Of all the high-temperature combustion sources, the nanoparticles from trash incineration are the most worrying because they are the most toxic.

Concern over nanoparticle emissions from incinerators has grown significantly since 2000. Nanoparticles, sometimes referred to as ultrafine particles, are particles of less than one micron in diameter.

There are very serious health concerns with nanoparticles.

The key concern is that these very tiny particles can easily cross cell membranes. Thus the normal defense mechanisms preventing particle entry to tissues do not prevail with

nanoparticles. Nanoparticles can get into the bloodstream. They can then travel to every tissue in the body and enter these as well. They can even cross the blood-brain barrier.

Of all the high-temperature combustion sources, the nanoparticles from trash incineration are the most worrying because they are the most toxic. Incinerators take in essentially all the toxic elements we use in the manufacture of products.

Worse yet, nanoparticle emissions are neither being regulated nor monitored in incinerators. The particle sizes regulated in incinerator emissions are generally 10 microns; in some countries this may be going down to 2.5 microns.

There has been a surprising lack of response to concerns expressed on the nanoparticle issue from the incinerator builders and the governments that promote them.

It is already well established that disease rates in large cities can be related to air particulate levels. Both morbidity (from respiratory problems and heart disease) and mortality rates go up as the level of particulates go up. Moreover, as the particle size measured goes down this relationship gets stronger. It stands to reason that if an incinerator is built in an already polluted city, both morbidity and mortality rates are going to increase because of the very toxic nanoparticles they inevitably release. In other words, it will make a bad situation in a polluted city even worse.

Those who promote incineration have a slick (sick?) public relations way of handling these realities. They have couched this discussion in a term: deaths brought forward (DBF). Here is a how one incinerator company describes it:

It is important to note that an increased risk of mortality and morbidity, due to elevated PM10 (particulate) exposure, is small and limited to a fraction of a population, which is already in poor health. As such the term DBF does not constitute new/additional deaths but a reduction in life expectancy for those whose health is already seriously compromised.

What they are saying here is that incinerator emissions don't kill people, they simply shorten their lives! Such a perverse sentiment brings the public relations of incineration promotion to a new low level.

Argument 8: Incinerators Are Extremely Unpopular with the Public

Because of many of the concerns above, incinerators are hugely unpopular with the public. When citizens probe beneath the smooth veneer of promotion, they see that what at first might appear to be a quick-fix solution does not look so quick once the political and legal battles begin. Again, let's remember that more than three hundred of the roughly four hundred incinerators proposed for North America between 1985 and 1995 were defeated. There were reasons for that, and many of those reasons remain unchanged.

Argument 9: Incinerators Are Not Sustainable

Incineration of municipal waste dates back to the nineteenth century (the first WTE plant was operating in Hamburg, Germany, in 1895). Incineration has no place in the twenty-first century.

On the global scale, incinerators waste energy and waste the opportunity to really fight global warming. On the local scale, incineration wastes the opportunity to create jobs and otherwise help the local economy in a sustainable fashion.

Even if the finest engineers could solve the nanoparticle and ash disposal problems, they would not make the incineration of trash acceptable. It simply doesn't make either ethical or economic sense to spend so much time, money, and effort destroying materials we should be sharing with the future. Society's task today is not to perfect the destruction of our waste but to stop making products and packaging that have to be destroyed.

Argument 10: There Are Better Alternatives
And that is what the rest of this book is about.

This excerpt is adapted from *Zero Waste Solution: Untrashing the Planet One Community at a Time* by Paul Connett, 2013, Chelsea