

# Why incineration is a very bad idea in the Twenty First Century.

by Paul Connett, PhD



An introduction to myself. I taught environmental chemistry and toxicology at St. Lawrence University in Canton, NY. I reached the rank of full professor and retired in May 2006. Since 1985 I have researched the dangers of incineration (I have co-authored six papers on dioxin) and have vigorously promoted an alternative strategy consisting of intensive recycling, composting, reuse, repair and re-design "if we can't reuse it, recycle it or compost, industry shouldn't be making it." Today this approach is called the Zero Waste 2020 strategy. This effort has taken me to 49 states in the US, 7 provinces in Canada and 51 other countries. In all I have given over 3000 pro bono presentations, largely to community groups but occasionally some officials deign to listen. On January 12, 2010 I had the honor of giving a presentation "Zero Waste for Sustainability" to the Division for the Sustainable Development at the United Nations.

## Sustainability.

I will begin here: after ending war, sustainability is the most crucial challenge our civilization has faced since the beginning of the industrial revolution. On a finite planet we cannot run a throwaway society indefinitely. We have to ape nature and recycle everything we possibly can. We would need four planets if everyone in the world consumed like Americans. We would need two planets if everyone consumed like Europeans. Meanwhile, both India and China, with their massive populations, are hell-bent on copying our "over-consuming" lifestyle. It was India's Mahatma Gandhi who many years ago said that "the world has enough for everyone's need, but not for everyone's greed." We in the North and the West need to set a better example. Something has to change and the best place to start is with waste. Everyone makes waste, and as such we are all part of living in a non-sustainable way. But if everyone took that first vital step of keeping their discarded materials separate then they could join the movement which would move the world in a sustainable direction.

## Incineration is not sustainable.

Every time a community builds a trash incineration it sets back the real solutions by 25 years - the time it takes to pay back the massive investment involved. Every time you burn something you have to go back to the beginning of the linear society (extraction- manufacture-consumption-waste). After 25 years you are no closer to sustainability. All you are left with is a pile of ash of approximately one quarter of the mass of the trash that was burned. Promoters claim that incineration produces energy and fights global warming. This is utter nonsense. Three - four times more energy is saved by recycling the same materials as burned. One European company estimates that a combination of recycling and composting reduces global warming gases some 46 times more than incineration generating electricity (AEA, 2001).

The social costs of incineration are staggering especially in developing countries. The huge amount of money spent on incineration goes into complicated machinery (over half the capital cost is needed for

air pollution control) and most of it leaves the country in the pockets of the multinational companies that build these monsters. With the alternatives most of the money goes into creating local jobs and local businesses, thereby staying in the community and the country. In Brescia, Italy, they spent about \$400,000,000 building an incinerator and have created just 80 full-time jobs. While Nova Scotia, a province of Canada, after rejecting an incinerator, has created over 3000 jobs in the handling of the discarded resources and in the industries using these secondary materials.

So incineration is neither sound for the planet nor for the local or national economies. However, because this matter is largely in the hands of engineers and engineering consultants the only issue that has dominated their discussion is "Is it safe?"

### **Is incineration safe?**

This is an issue I have followed for 25 years. The issue that peaked my interest was the incredible fact that simply by burning household trash we make the most toxic substances that we have ever been able to make in a chemical laboratory: polyhalogenated dibenzo para dioxins and furans (PCDDs, PCDFs, PBDDs, PBDFs etc) called "dioxins" for short. There are literally thousands of these substances. There is no question that over 25 years the industry has got better at capturing these pollutants but we are still hostage as to how well the plants are designed and operated, monitored and the regulations enforced. In addition to this, incineration releases many toxic metals from otherwise fairly stable matrices. At worst these metals (lead, cadmium, mercury, chromium etc) go into the air, at best they are captured in the fly ash in the air pollution control devices (APC). But it is a truism to state that the better the APC the more toxic the ash becomes. Where is this ash going to go? In Germany and Switzerland the fly ash is put into nylon bags and deposited in salt mines. In Japan a number of the incinerators vitrify the ash, making it into a glass-like material, but that takes a huge amount of energy away from the system. Do you know where the ash is going in this proposal?

For every four tons of trash burned you get at least one ton of ash: 90% is called bottom ash (that is the ash collected under the furnace) and 10% is the very toxic fly ash.

### **The formidable issue of nanoparticles.**

There is nothing new about nanoparticles, which are particle of less than one micron in diameter. They are produced in any high temperature combustion which includes vehicles, coal-fired power stations, industrial boilers etc. What is new is nanotechnology where these particles, which have very unusual properties, are being used in many commercial products from shaving cream to tennis rackets. This has raised the question of whether they have any negative health effects. That question has given rise to a new discipline called nanotoxicology. It turns out that these particles have exquisite biological properties which are very worrying. They are so tiny that they can cross the lung membrane and enter the bloodstream. Once there they can enter every tissue in the body including the brain. The problem with incineration is twofold: a) because every object in commerce is likely to end up in an incinerator any toxic element used in these products is likely to end up in the nanoparticles. The nanoparticles from incinerators are the most dangerous of any common source. b) There are NO regulations in the world for the monitoring nanoparticles from incinerators. In most countries the particles regulated are 10 microns and above. In some countries they regulate particles at 2.5 microns. But neither standard comes closer to monitoring nanoparticles. We are flying blind on this crucial issue.

I have attached a very important paper on this issue from Dr. Vyvyan Howard from Northern Ireland. I know Vyvyan very well and he is one of the brightest people I have ever met. He co-authored a book on nanoparticles in 1999. The attached paper was delivered in 2009 in a hearing on an incinerator proposed for Ireland. It is the most up to date review of the issue of nanoparticles and incineration available. Before any new incinerator is built in India, or anywhere else for that matter, government officials (or the public) should force the project director to produce a scientific response to the key questions posed in this paper. If they cannot do so, then clearly building such a plant is taking a reckless gamble with the public's health. Moreover, if we return to the opening of this statement, such a gamble cannot be justified on either economic or environmental grounds, both local and global.

### **The alternatives are not pie-in-the-sky**

Many communities in California, Canada, Italy, New Zealand, Spain and the UK have embarked on the zero waste strategy (not all call it that) and have achieved some with very rapid and impressive results. San Francisco (population 850,000) has reached 72% diversion from waste disposal. Their goal for 2010 is 75% diversion and their goal for 2020 is Zero Waste. Many other communities in California have also reached over 70% diversion. In Italy over 200 communities have done so. Novarra near Turin (pop. 100,000) reached 70% in just 18 months. Salerno, went from 18% to 82 % in one year. Villafranco d'Asti (population 35,000) has reached 85% diversion and the small town of Ursibil in Spain has reached 86%.

### **Zero Waste in India**

India is uniquely placed to achieve even greater diversion rates. You have hundreds of thousands of "rag pickers" scavenging every last piece of glass and bottle top from your landfills. Instead of frittering away millions (maybe billions) of dollars building giant incinerators put that money into formalizing this sector: give them buildings, good working conditions, protective clothing, showers etc, and educate their kids. Form them into cooperatives so that they can continue to share in the profits of the recovered material (if this is not made clear they will probably fight such a change). What these people are doing is the most difficult task of all: looking after the residuals. More than anything else these people need our respect. Householders can look after the recyclables, compostables and reusables.

For more about the nuts and bolts about the zero waste approach see my webpage at [www.AmericanHealthStudies.org](http://www.AmericanHealthStudies.org). There you will find a series of videotapes I have shot on Zero Waste around the world and also an essay entitled Zero Waste for Sustainability.

Remember we have only got one planet and we must start behaving as if that was the case. I will also forward the power point presentation I gave at the UN on Jan 12, 2010 if any one is interested.

Paul Connett, PhD  
Executive Director,  
American Environmental Health Studies Project (AEHSP),  
82 Judson Street,  
Canton, NY 13617  
315-379-9200  
[pconnett@gmail.com](mailto:pconnett@gmail.com)  
[www.AmericanHealthStudies.org](http://www.AmericanHealthStudies.org)