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Waste Incineration An Expensive, Polluting, Dead-End Technology



Member of:

- Stockholm Convention BAT BEP and Dioxin Toolkit Expert Group
- Basel Convention POPs waste working group.
- Contaminated Site Expert Group Minamata Convention
- Mercury Waste Expert Group Minamata Convention





Incinerators are 'linear' technology that destroy resources while generating toxic emissions and toxic ash.

- They do not fit in a circular economy which is based on recycling and conservation of resources. Incinerators are antiquated disposal technology.
- In Australia we do not need the tiny amount of energy they produce at the cost of the pollution they create. We have renewables.
- We do not need to jeopardise our health, our food chain and agricultural exports to burn rubbish. We need comprehensive recycling infrastructure.
- Europe is removing subsidies and support for incineration while launching taxes for waste sent to incinerators acknowledging they have made a costly mistake.




LINEAR ECONOMY



CIRCULAR ECONOMY





“When considering proposals to construct new waste incinerators, **priority consideration should be given to alternatives** such as activities to minimize the generation of waste, including resource recovery, reuse, recycling, waste separation and promoting products that generate less waste.”

WHY?

STOCKH
CONVEN

Protecting human health and the en
from persistent organic

What is the Stockholm Convention concerned about?

Various studies in Japan, Spain, and Germany show that incinerator workers or children and other residents living near incinerators have significantly higher blood or urine levels of dioxins, furans, polychlorinated biphenyls, hexachlorobenzene, 2,4/2,5-dichlorophenols, 2,4,5-trichlorophenols, hydroxypyrene, toluene, and tetrachlorophenols compared to control groups or to national averages.

UNEP Compendium of Technologies for Treatment / Destruction of Healthcare Waste. 2012



Unintentional Persistent Organic Pollutants (UPOPs)

- Hexachlorobenzene (HCB);
- Hexachlorobutadiene (HCBD)
- Pentachlorobenzene (PeCB);
- Polychlorinated biphenyls (PCB);
- Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF); and
- Polychlorinated naphthalenes (PCN).

Sources of UPOPs:

- waste incinerators
- cement kilns
- metallurgy plants



What is the impact of these chemicals in the body?

Epidemiological studies indicate an association between incineration and cancer. Studies in the United Kingdom found an increased risk of childhood cancer, childhood leukemia, and solid tumors of all kinds among children living near incinerators. Studies in France, Japan, Italy, United Kingdom, and Sweden found a cluster of soft tissue sarcoma and non-Hodgkin's lymphoma; a two-fold cancer risk; increases in laryngeal cancer; increases in lung cancer or lung cancer mortality; and generally higher risks of all cancers but specifically of stomach, colorectal, liver, and lung cancer among populations living near incinerators.

***UNEP Compendium of Technologies for Treatment /
Destruction of Healthcare Waste. 2012***



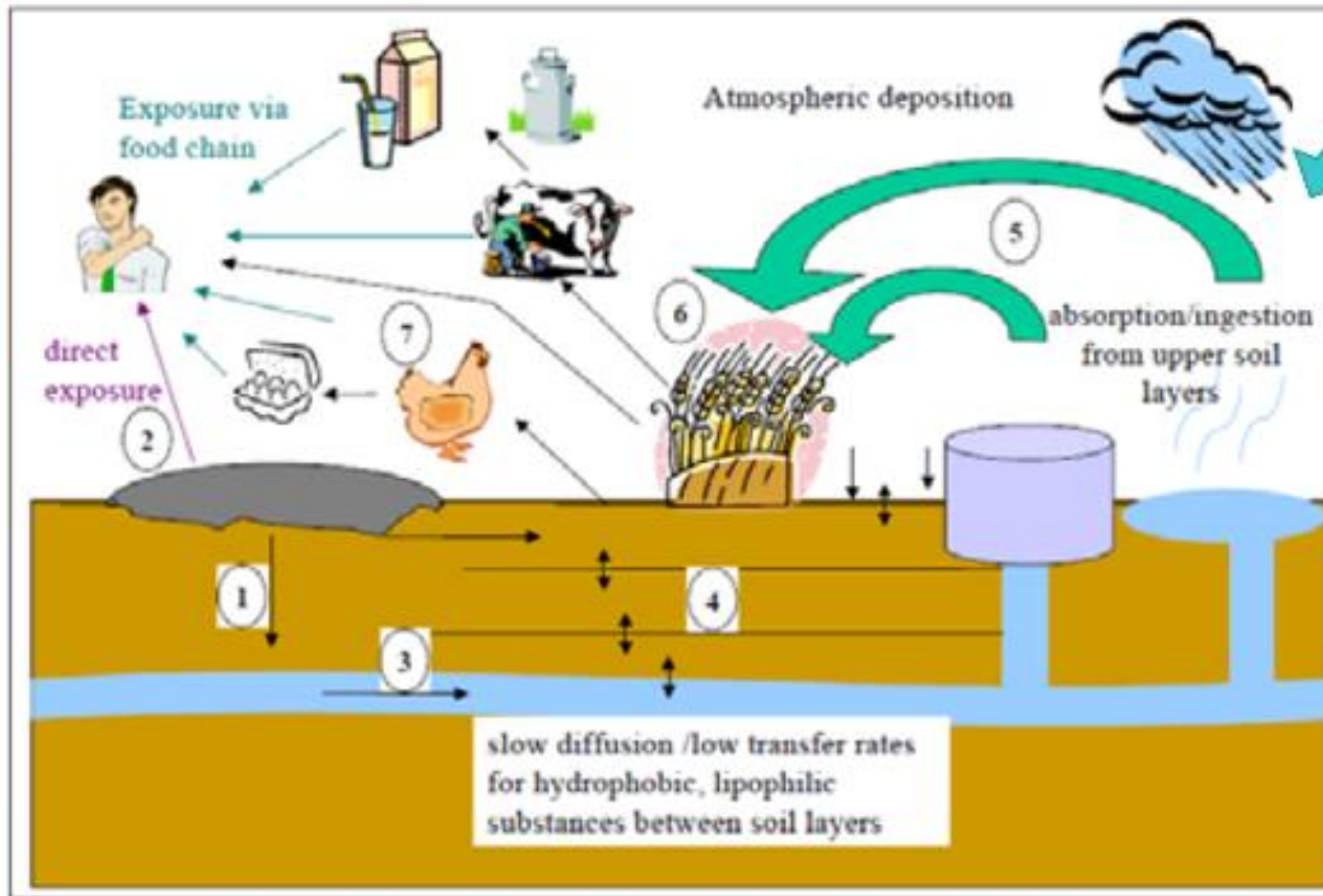
The health impacts of waste incineration: a systematic review

Peter W. Tait,^{1,2} James Brew,¹ Angelina Che,¹ Adam Costanzo,¹ Andrew Danyluk,¹ Meg Davis,¹ Ahmed Khalaf,¹
Kathryn McMahon,¹ Alastair Watson,¹ Kirsten Rowcliff,¹ Devin Bowles^{1,3}

A 2019 Australian public health expert global incineration meta-study concludes:

- This review shows contamination of food and ingestion of pollutants is a significant risk pathway for both nearby and distant residents.
- This systematic review highlights significant risks associated with waste incineration as a form of waste management.
- While the results were not consistent across the literature, based on a precautionary principle there is insufficient evidence to conclude that any incinerator is safe.
- Local community groups have a basis for legitimate concern and so siting of incineration facilities needs to take these concerns into account.

Dioxin Receptor Pathways



Dioxin in the ash

Brominated dioxins – PBDD/DF

Chlorinated dioxins – PCDD/DF

Mixed halogenated dioxins - PXDD/DF

Dioxin like PCBs – DL PCBs



Dioxin health impacts

- **Teratogenic- birth deformities**
- **Mutagenic – damages DNA**
- **Carcinogenic – causes cancer**
- **Immunotoxin – weakens and attacks the immune system.**
- **Hepatotoxic – toxic to the human liver.**
- **Also; chloracne, diabetes, endometriosis and endocrine system disruption.**

Image: Vietnamese children suffering birth defects as a result of parental exposure to dioxin in Agent Orange sprayed during the Vietnam war





Bottom ash and fly ash – Incineration is no solution to landfill

- For every 1000 kg of waste burned around 300 kg of toxic ash is produced.
- Of that 300 kg around 15 kg (approx. 5%) is extremely hazardous fly ash from the Air Pollution Control (APC) equipment with chlorinated dioxins.
- The rest is bottom ash contaminated with lower levels of heavy metals and POPs but relative high unregulated, brominated dioxins which has been implicated in food chain contamination.
- **For Victoria alone**, 1.6 million tonnes of incineration capacity are proposed.
- This will require hazardous waste landfill capacity of an additional 80,000 tonnes per annum for fly ash and 2.4 million tonnes for the lifetime of the incinerators.
- For bottom ash additional capacity of 400,000 tonnes pa or 12 million tonnes for the lifetime of the incinerators will be required.

In which electorate will these new hazardous waste landfills be constructed and who are the brave politicians who will promote them?

What might these
toxic ash landfills
look like?

**Covanta “Combined Ash” monofill,
Haverhill, Massachusetts. USA**



TOXIC ASH POISONS OUR FOOD CHAIN



TOXIC ASH POISONS OUR
FOOD CHAIN



Jindrich Petrlik
and Lee Bell,
IPEN

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Toxic ash management and 'products'.



Toxic ash = Toxic bricks

Unregulated ash is contaminating eggs with dioxin.

A Swedish EPA study demonstrated that PCDD/Fs levels of 30 pg TEQ g⁻¹ fat in an egg will be exceeded at soil concentrations of approximately 4 to 75 ng TEQ kg⁻¹ d.m. Therefore, the European maximum level of 2.5 pg TEQ g⁻¹ PCDD/F in fat in eggs can be exceeded at levels that are ten times lower (i.e. 0.4 and 7 ng TEQ kg⁻¹ d.w.). Based on the upper level of the range given in a recent Swedish EPA study and examples of a scenario with contaminated wood waste, it can be concluded that application of fly ash and other wastes containing levels of dioxin over 0.05 ppb in land-based application can lead to unacceptable contamination of the local food chain.

The current limit on dioxin in waste is 15 ppb. Anything less can be dumped on land.

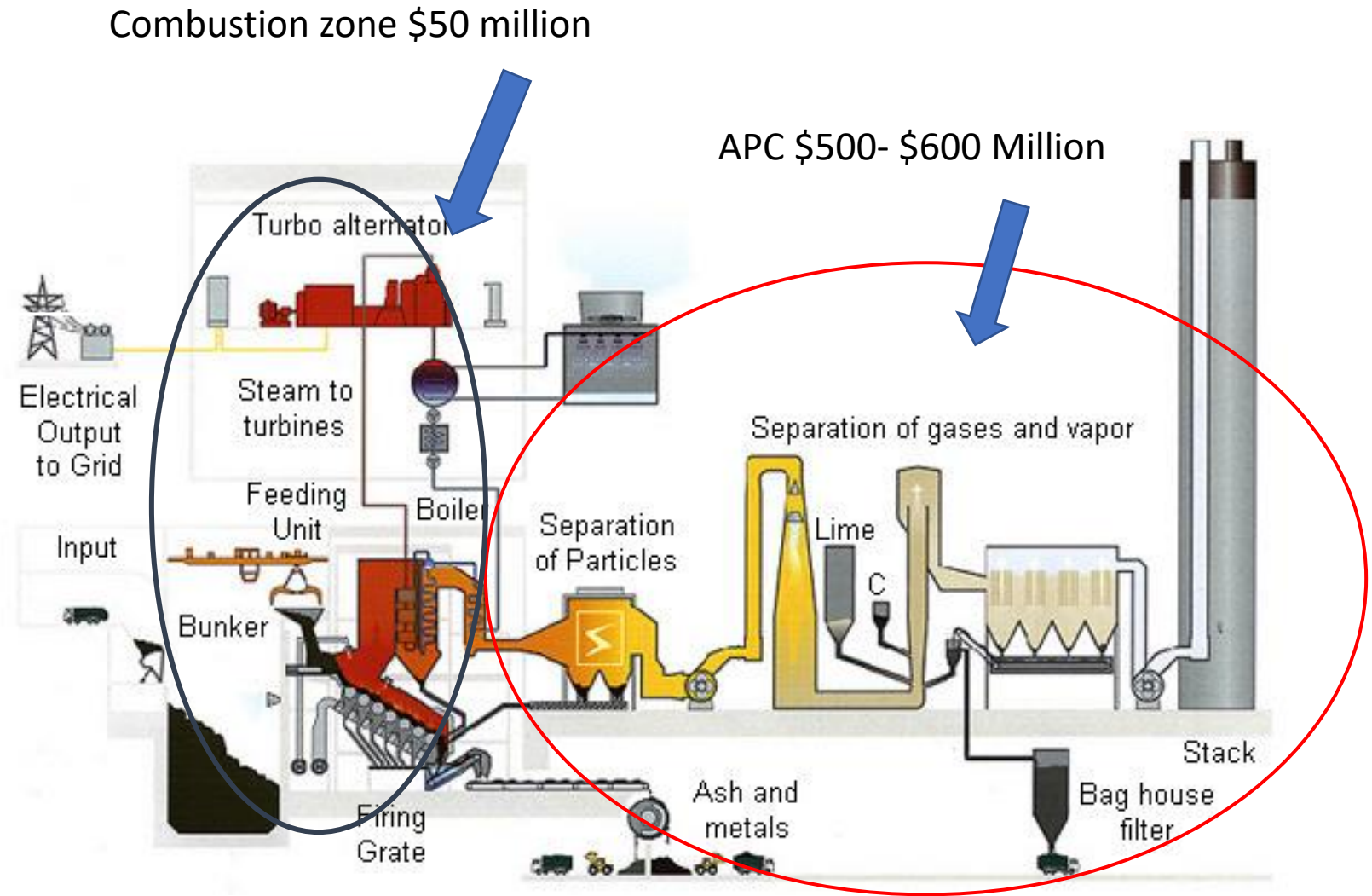
In some other studies, even lower levels of dioxins in soils led to contamination of free range chicken eggs exceeding the EU standard for food (2.5 pg WHO-TEQ g⁻¹ of fat). Free range eggs can be impacted at critical levels exceeding currently used safety limits (2.5 pg WHO-TEQ g⁻¹ fat) by several-fold, with some cases revealing a more than 20-fold exceedance. (Petrlik and Bell, 2018)

- Pirard, C., et al., *Assessment of the impact of an old MSWI. Part 1: Level of PCDD/Fs and PCBs in surrounding soils and eggs*. Organohalogen Compounds, 2004. **66**: p. 2085-2090.
- Harnly, M., et al., *Polychlorinated Dibenzo-p-dioxin and Polychlorinated Dibenzofuran Contamination in Soil and Home-Produced Chicken Eggs Near Pentachlorophenol Sources*. Environ. Sci. Technol., 2000. **34**(7): p. 1143-1149.
- DiGangi, J. and J. Petrlik, *The Egg Report - Contamination of chicken eggs from 17 countries by dioxins, PCBs and hexachlorobenzene*. 2005: Available at: <http://english.arnika.org/publications/the-egg-report>.

'Best practice' for incineration is very expensive.

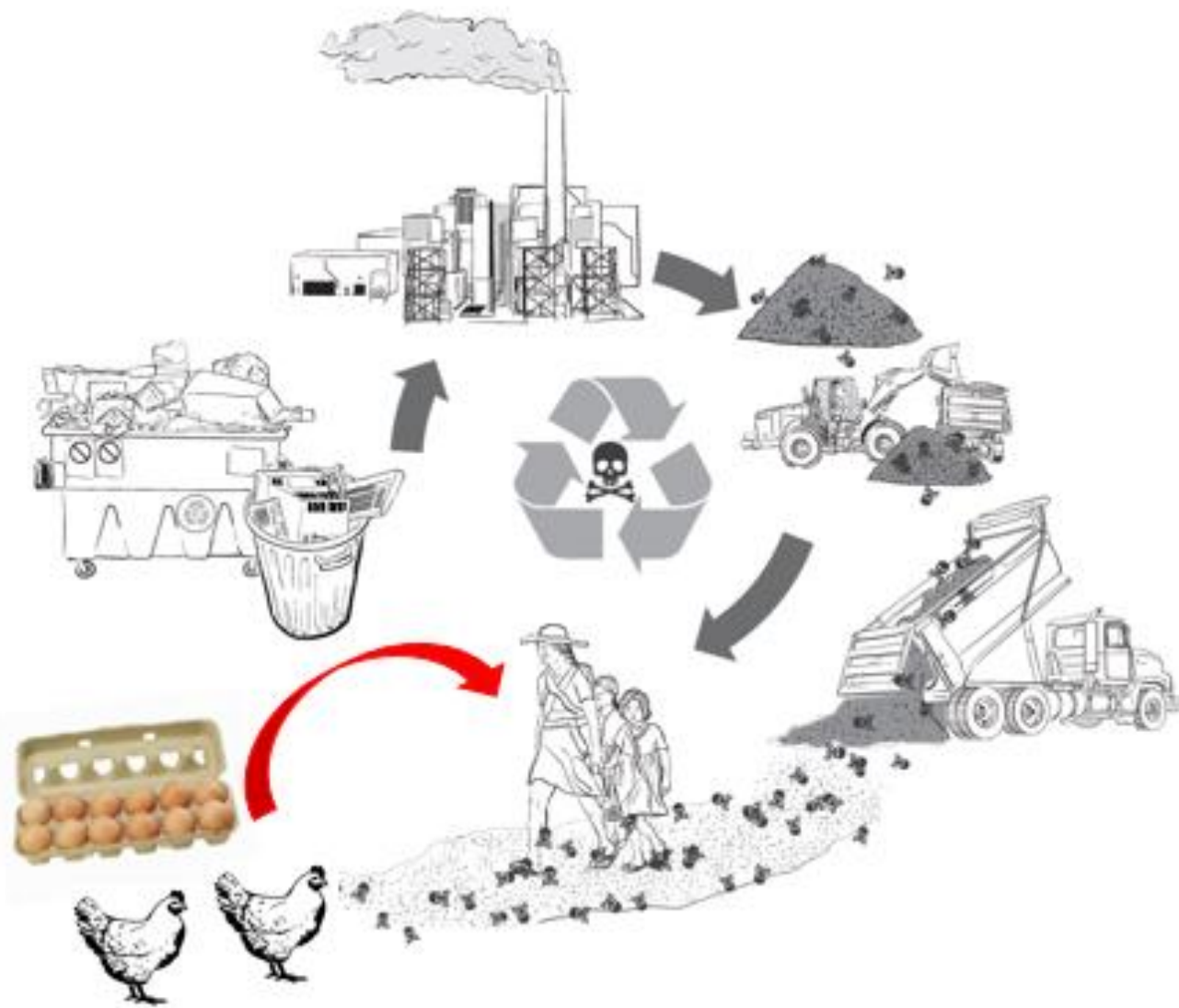
Are you getting Best Available Technique and Best Environmental Practice (BAT BEP)?

- Activated carbon powder injection for reducing dioxin and mercury emissions
- Urea for reducing NOX emissions
- Lime or calcium injection for SOx and HCl reduction
- Electrostatic precipitators for particulate/ash
- Baghouses for fly ash
- Cyclone filters for dust/ash
- Temperature above 850C
- 2 second residence time in combustion chamber



Using BAT BEP
transfers dioxin
from the stack
to the ash.

And then
contaminates the
food chain.....



Dioxin contamination lasts for generations





Thanks for your
attention and for
opposing
incineration.