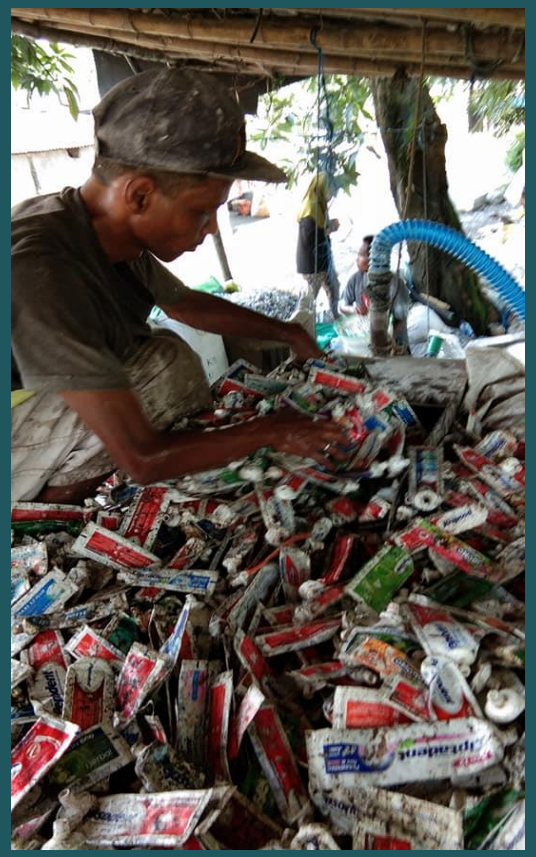
Zero Waste Australia

The threat of waste to energy incineration in Australia



Plastics

Coca-Cola increased its production of plastic bottles by a billion last year, says Greenpeace

Increase puts Coke's production at more than 110bn single-use plastic bottles a year, according to analysis by the green group

10,380 520

Sandra Laville

Monday 2 October 2017 20.28 AEDT

Waste – a window into our materials production processes

Proposals in Australia

"Zero Waste is a goal that is both pragmatic and visionary, to guide people to emulate sustainable natural cycles, where all discarded materials are resources for others to use. Zero Waste means designing and managing products and processes to reduce the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them. Implementing Zero Waste will eliminate all discharges to land, water, or air that may be a threat to planetary, human, animal or plant health. "

Definition of Zero Waste as adopted by the Zero Waste International Alliance

www.zerowasteaustralia.org

Zero Waste Australia

Western Australia

- Port Headland - Technology: Gasification incineration (15.5 MW)
  Waste feedstock: 205 000tpa Municipal Solid Waste, Construction and Demolition waste, Commercial and Industrial waste, Tyres, greenwaste and liquid wastes.

  Status – approved not yet built
- Kwinana - Technology: Mass Combustion (36Mw)
  Waste feedstock: 400,000 tpa tonnes Municipal Solid Waste, Commercial and Industrial waste, Construction and Demolition waste

  Status – Approved under construction
- Rockingham - Technology: Mass Combustion (28.2 Mw)
  Waste Feedstock: 330 000 tonnes of Municipal Solid Waste, Construction and Demolition waste, Commercial and Industrial waste and sewage sludge.

  Status – Approved under construction
- Hazelmere: Technology: Pyrolysis incineration (4MW),
  Waste feedstock: 13 000 tpa Wood wastes

  Status – Approved not yet built

Total: 975 000 tpa

South Australia

- Lonsdale -Technology: Tyre Derived Fuel for burning in the Cement kilns, Paper and Steel mills across Australia.
  Waste feedstock: 120 000 tonnes/ pa of waste tyre materials.

  Status –approved, built and operating

- Wingfield: Technology: Process Engineered Fuel (PEF) to be burnt in Adelaide Brighton Cement, Birkenhead, South Australia.
- Waste feedstock: 120 000 tonnes/pa of PEF sourced from Commercial and Industrial wastes, Construction and Demolition waste (including cardboard, paper, plastic, timber, metals, bedding, concrete, bricks and rubble and including non-recyclable plastic waste)

  Status: approved, built and operating

Total: 440 000 tpa TDF and PEF

Victoria

- Ballarat - Technology: Yet to be decided.

  Waste feedstock: 400,000 tonnes Municipal Solid Waste.

  Status: This Ballarat Council led process has been put on hold in August due to the policy uncertainty in Victoria but could be reignited at any time.

- Laverton -Technology: Gasification

  Waste feedstock: 200,000 tonnes Municipal Solid Waste

  Status: under review by EPA

- Dandenong - Technology: Gasification

  Waste feedstock: 400,000 tonnes Municipal Solid Waste

  Status: under review by EPA

- Maryvale - Technology: Mass combustion incineration technology (225 MW).
  Waste feedstock: 520,000 tonnes municipal, commercial and industrial waste, utilised from Inner City, Eastern and South Eastern Victorian municipalities.

  Status: Approved

Total:1.52 million tpa

New South Wales

- Portland - Technology: Refuse Derived Fuel boiler attached to a Mass Combustion technology. (27Mw)
  Waste feedstock: 200 000 tpa Refuse Derived Fuel containing non recyclable plastics, paper and cardboard and other residual wastes
  Status: approved

- Western Sydney - Technology: Mass Combustion (69 Mw)
  Waste feedstock: 500 000 tpa (up to 1 million) Municipal Solid Waste, Constructions and Demolition waste, Commercial and Industrial waste, Shredder Floc (cars)
  Status: rejected but under appeal in the Land and Environment Court of NSW

- Western Sydney - Technology Mass combustion (55MW)
  Waste feedstock: 500 000 tpa MSW and Commercial and Industrial residual wastes
  Status: preparing EIS for EPA review

- Wetherill - Technology Mass Combustion in cement kilns
  Waste feedstock 250 000 tpa MSW, Commercial and Industrial and Construction and Demolition wastes.
  Status: approved and operating

- Matraville - Technology: Gasification
  Waste feedstock: 200 000 tpa MSW as PEF
  Status: EIS being prepared for EPA review

Total: 1.65 million tpa

Queensland

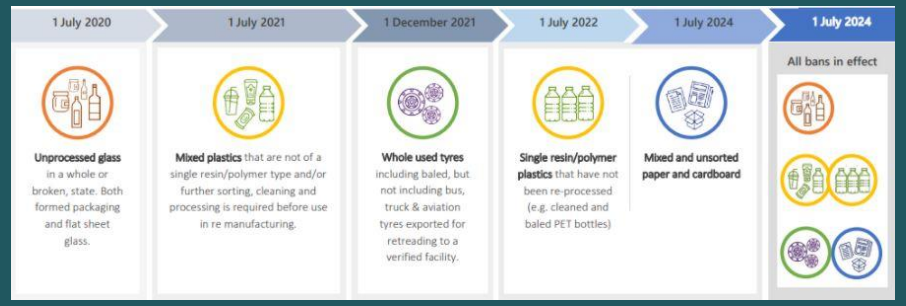
- Swanbank - Technology: Mass Combustion (50Mw)
  Fuel feedstock: 500 000 tonnes of Municipal Solid Waste and Biomass wastes.

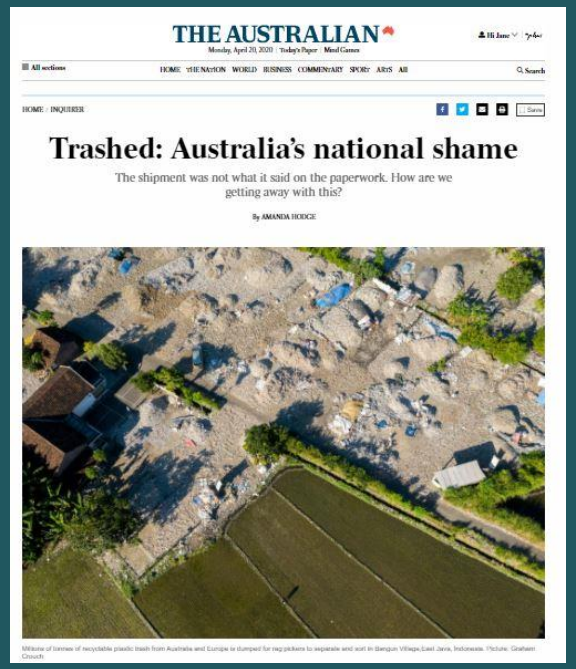
  Status: preparing EIS

  Total: 500 000 tpa

Australian total: 5.85 million tpa

Australian waste export ban




THE AUSTRALIAN

Trashed: Australia's national shame

The shipment was not what it said on the paperwork. How are we getting away with this?

By AMANDA HODGE

The key to resolving the market challenges for mixed plastic is a combination of:

- **Better packaging design** to specify more recyclable polymers (e.g. PET, HDPE, LDPE and PP) and to ensure that all components, such as labels, caps and adhesives, are compatible in the recycling system. As strong markets exist for PET, HDPE, LDPE and PP, the preferred use of these plastics in consumer packaging, without other polymer additives, would see more packaging sorted and sold at higher prices. Plastics infrastructure analysis update – Project report Envisage Works – Positive Impact Consulting Page 19

- **More diligent sorting** of the recycled material by automated and manual means. This could be achieved, for example, by upgrading polymer sorting equipment to positively identify and sort additional polymer types, such as; LDPE, polypropylene and polystyrene packaging, and additionally, to improve the current positive polymer sorting of PET and HDPE to increase sorting recovery rates. This would reduce the amount of mixed, low value plastic product being generated.

- **Drive recycled content plastic products** market pull-through with more supportive procurement practices from governments at all levels and major businesses, particularly those with a product stewardship exposure.

- The potential introduction of **chemical recycling** technologies to enable the recycling of mixed polymer, composite and other hard to recycle plastic products (e.g. textiles). See Section 6 for an overview of chemical recycling.

- **Highly contaminated or composite scrap plastics to waste to energy.**


Malaysia to send up to 100 tonnes of plastic waste back to Australia

Environment minister says recycling sent from Australia included plastic bottles that were 'full of maggots'

Malaysia cracks down on imported plastic – video


Report prepared by

Envisage WORKS

Report prepared for

Department of the Environment and Energy

Plastics infrastructure analysis update

Project report

Final report

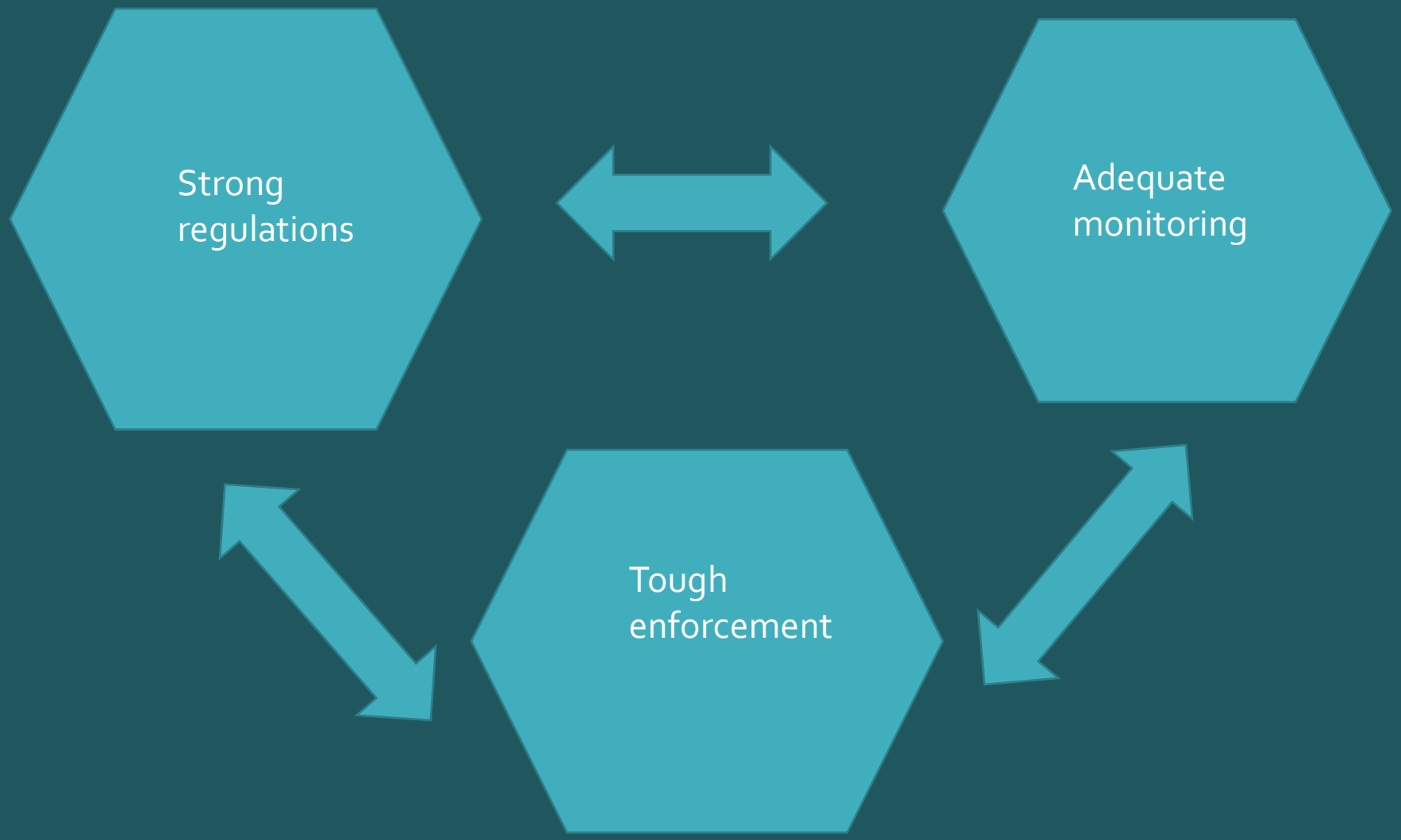
11 November 2019

Waste fires in Australia

WA waste fire Nov 2019

Victorian waste fire August 2018

How is public health and the environment protected from incinerator pollution?

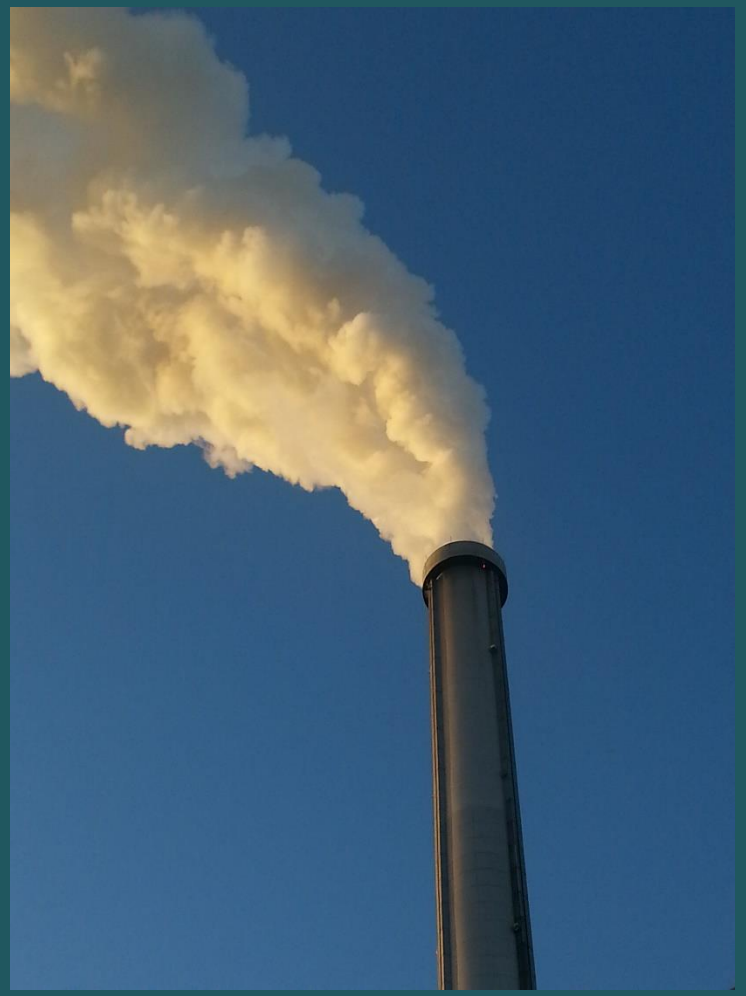


Current Ambient Air Quality NEPM standards

	Pollutant	Averaging period	Maximum concentration	Goal within 10 years maximum allowable exceedences
1	Carbon monoxide	8 hours	9.0 ppm	1 day a year
2	Nitrogen dioxide	1 hour 1 year	0.12 ppm 0.03 ppm	1 day a year none
3	Photochemical oxidants (as ozone)	1 hour 4 hours	0.10 ppm 0.08 ppm	1 day a year 1 day a year
4	Sulfur dioxide	1 hour 1 day 1 year	0.20 ppm 0.08 ppm 0.02 ppm	1 day a year 1 day a year none
5	Lead	1 year	0.50 $\mu g/m^3$	none
6	Particles as PM_{10}	1 day	50 $\mu g/m^3$	5 days a year
7	Particles as $PM_{2.5}$	1 day 1 year	25 $\mu g/m^3$ 8 $\mu g/m^3$	

Incinerator air emissions

- oxides of nitrogen (NOx)
- carbon monoxide (CO)
- sulfur dioxide (SO_2)
- particulates (TSP, PM10, PM2.5 and nano-particles),
- volatile metals (As, Sb, Co, Cr, Cu, Pb, Mn, Ni, V)
- Mercury and cadmium
- acid gases (HCl, HF and SO_2)
- volatile organic compounds (VOCs),
- polycyclic aromatic hydrocarbons (PAHs),
- dioxins and furans.



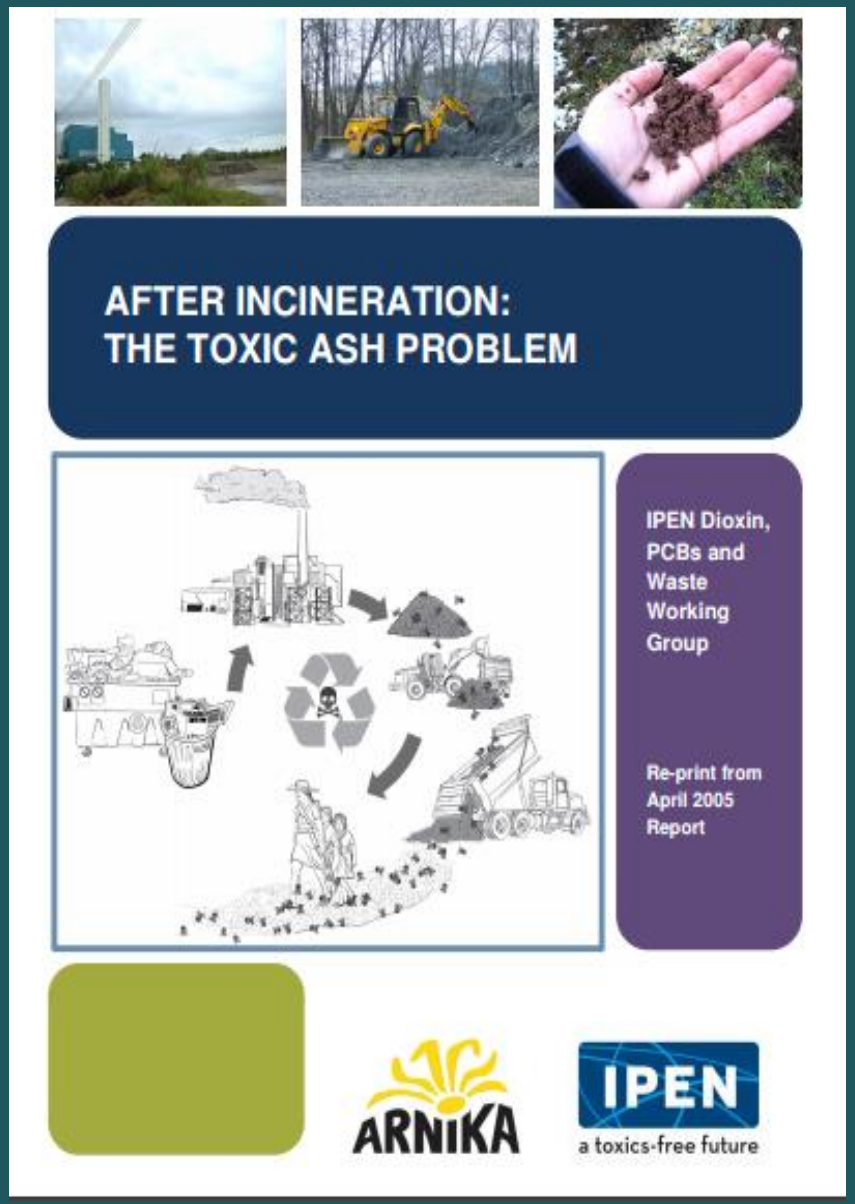
Incineration & nanoparticles

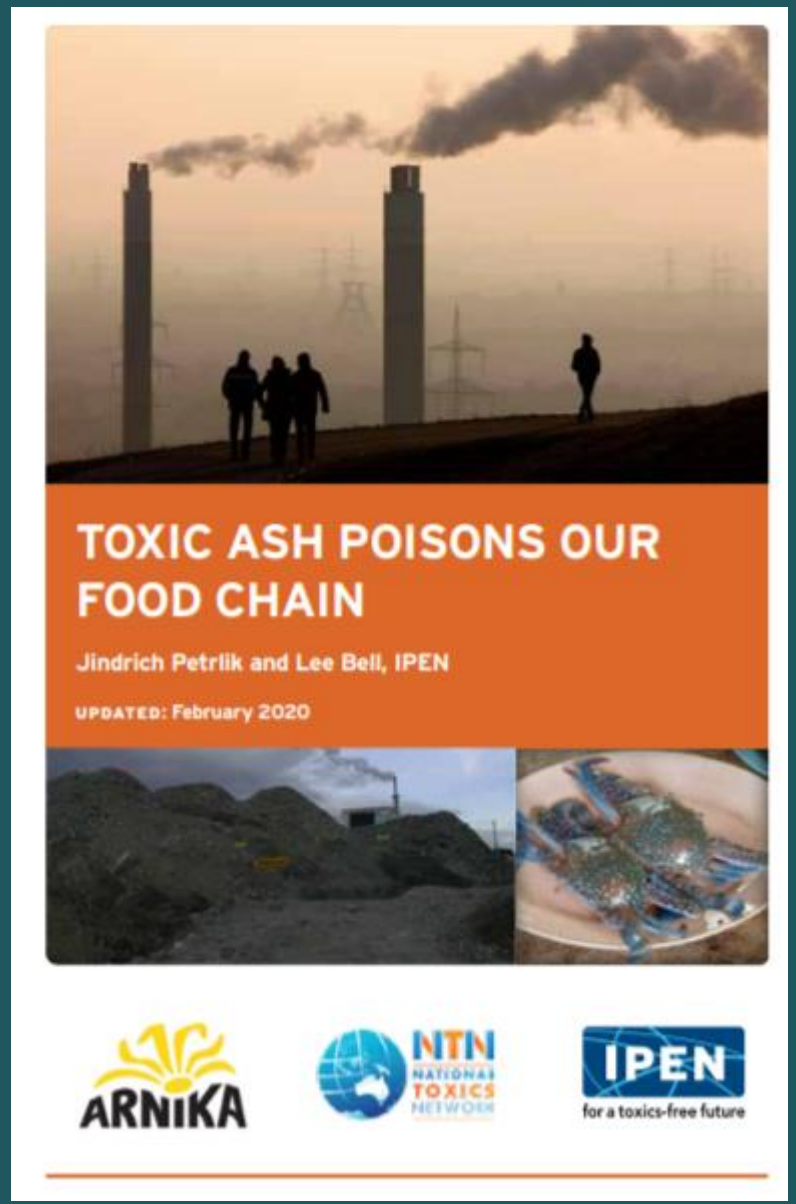
Nanoparticles from incinerators contain:

- neurotoxic metals,
- stabilized free radicals
- thousands of newly synthesized compounds (including PCBs, dioxins and furans).
- Any toxic element used in commerce has the potential to end up in nanoparticles produced by incinerators

The global dangers of nanoparticles

- Nanoparticles are not efficiently captured by air pollution control devices,
- travel long distances,
- penetrate deep into the lungs


AFTER INCINERATION:
THE TOXIC ASH PROBLEM
IPEN Dioxin, PCBs and Waste Working Group
Re-print from April 2005 Report
ARNIKA
IPEN
a toxics-free future


TOXIC ASH POISONS OUR FOOD CHAIN
Jindrich Petrlik and Lee Bell, IPEN
UPDATED: February 2020
ARNIKA
NTN
NATIONAL TOXICS NETWORK
IPEN
for a toxics-free future

Children's environmental health protection – a policy driver

- Children are not little adults
- Chemicals interrupt fundamental windows of development, causing long term impacts.
- Children inhale, ingest and absorb more pollution than adults
- Children's toxic elimination processes are undeveloped.
- Chemical body burdens are increasing by generation.
- Our children (including in-utero) are the most vulnerable.

Protect children's environmental health and you protect the planet

International Journal of Environmental Research and Public Health

MDPI

Article

Biomonitoring of Metals in Children Living in an Urban Area and Close to Waste Incinerators

Agostino Di Ciaula [1,2,3,*], Patrizia Gentilini [2], Giusy Diella [4], Marco Lopuzzo [4] and Ruggero Ridolfi [2]

1 Division of Internal Medicine, Hospital of Bisceglie (ASL BAT), 76011 Bisceglie, Italy
2 International Society of Doctors for Environment (ISDE), 52100 Arezzo, Italy; patrizia.gentilini@villapacinotti.it (P.G.); ruggero.ridolfi@gmail.com (R.R.)
3 Clinica Medica "A. Murri", Department of Biomedical Sciences and Human Oncology, University of Bari "Aldo Moro", 70124 Bari, Italy
4 Department of Biomedical Science and Human Oncology, University of Study of Bari "Aldo Moro", 70124 Bari, Italy; giusy.diella@uniba.it (G.D.); marcolopuzzo@gmail.com (M.L.)
* Correspondence: agostinodiciaula@tiscali.it

Received: 5 February 2020; Accepted: 10 March 2020; Published: 16 March 2020

check for updates

Abstract: The impact of waste incinerators is usually examined by measuring environmental pollutants. Biomonitoring has been limited, until now, to few metals and to adults. We explored accumulation of a comprehensive panel of metals in children free-living in an urban area hosting two waste incinerators. Children were divided by georeferentiation in exposed and control groups, and toenail concentrations of 23 metals were thereafter assessed. The percentage of children having toenail metal concentrations above the limit of detection was higher in exposed children than in controls for Al, Ba, Mn, Cu, and V. Exposed children had higher absolute concentrations of Ba, Mn, Cu, and V, as compared with those living in the reference area. The Tobit regression identified living in the exposed area as a significant predictor of Ba, Ni, Cu, Mn, and V concentrations, after adjusting for covariates. The concentrations of Ba, Mn, Ni, and Cu correlated with each other, suggesting a possible common source of emission. Exposure to emissions derived from waste incinerators in an urban setting can lead to body accumulation of specific metals in children. Toenail metal concentration should be considered a noninvasive and adequate biomonitoring tool and an early warning indicator which should integrate the environmental monitoring of pollutants.

Keywords: metals; children; toenails; biomonitoring; waste; incinerators

Australian and New Zealand Journal of Public Health

Open Access

The Journal of the Public Health Association of Australia Inc.

Epidemiology | Open Access

The health impacts of waste incineration: a systematic review

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

First published:18 September 2019 | https://doi.org/10.1111/1753-6405.12939 | Citations: 1

The authors have stated they have no conflict of interest.

SECTIONS PDF TOOLS SHARE

Abstract

Introduction: Waste incineration is increasingly used to reduce waste volume and produce electricity. Several incinerators have recently been proposed in Australia and community groups are concerned about health impacts. An overview of the evidence on health effects has been needed.

Method: A systematic review of English language literature for waste incinerators and health using PRISMA methodology.

Results: A range of adverse health effects were identified, including significant associations with some neoplasia, congenital anomalies, infant deaths and miscarriage, but not for other diseases. Ingestion was the dominant exposure pathway for the public. Newer incinerator technologies may reduce exposure.

Discussion: Despite these findings, diverse chemicals, poor study methodologies and inconsistent reporting of incinerator technology specifications precludes firmer conclusions about safety.

Conclusion: Older incinerator technology and infrequent maintenance schedules have been strongly linked with adverse health effects. More recent incinerators have fewer reported ill effects, perhaps because of inadequate time for adverse effects to emerge. A precautionary approach is required. Waste minimisation is essential.

Implications for public health: Public health practitioners can offer clearer advice about adverse health effects from incinerators. We suggest improved research design and methods to make future studies more robust and comparable. We offer ideas for better policy and regulation.

The Health Effects of Waste Incinerators

4th Report of the British Society for Ecological Medicine

Second Edition
June 2008

Moderators: Dr Jeremy Thompson and Dr Honor Anthony

ZERO WASTE EUROPE

Report

November 2015

Air Pollution from Waste Disposal: Not for Public Breath

NCBI Resources How To

PubMed.gov US National Library of Medicine National Institutes of Health

PubMed Advanced

COVID-19 is an emerging, rapidly evolving situation.
Get the latest public health information from CDC: https://www.coronavirus.gov .
Get the latest research from NIH: https://www.nih.gov/coronavirus.

Format: Abstract Send to

Epidemiology. 2013 Nov;24(6):863-70. doi: 10.1097/EDE.0b013e3182a712f1.

Air pollution from incinerators and reproductive outcomes: a multisite study.

Candela S[1], Ranzi A, Bonvicini L, Baldacchini F, Marzaroli P, Evangelista A, Luberto F, Carretta E, Angelini P, Sterrantino AF, Broccoli S, Cordioli M, Ancona C, Forastiere F.

Author information

Abstract

BACKGROUND: The few studies that have investigated the relationship between emissions from municipal solid-waste incinerators and adverse pregnancy outcomes have had conflicting results. We conducted a study to assess the effects of air emissions from the eight incinerators currently in operation in the Emilia-Romagna Region of Italy on reproductive outcomes (sex ratio, multiple births, preterm births, and small for gestational age [SGA] births).

METHODS: We considered all births (n = 21,517) to women residing within a 4-km radius of an incinerator at the time of delivery during the period 2003-2010 who were successfully linked to the Delivery Certificate database. This source also provided information on maternal characteristics and deliveries. Each newborn was georeferenced and characterized by a specific level of exposure to incinerator emissions, categorized in quintiles of PM10, and other sources of pollution (NOx quartiles), evaluated by means of ADMS-Urban system dispersion models. We ran logistic regression models for each outcome, adjusting for exposure to other pollution sources and maternal covariates.

RESULTS: Incinerator pollution was not associated with sex ratio, multiple births, or frequency of SGA. Preterm delivery increased with increasing exposure (test for trend, P < 0.001); for the highest versus the lowest quintile exposure, the odds ratio was 1.30 (95% confidence interval = 1.08-1.57). A similar trend was observed for very preterm babies. Several sensitivity analyses did not alter these results.

CONCLUSIONS: Maternal exposure to incinerator emissions, even at very low levels, was associated with preterm delivery.

EUROPEAN
COMMISSION

Brussels, 26.1.2017
COM(2017) 34 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

The role of waste-to-energy in the circular economy

European Commission directive 2017.

- Legislation to require all member states to source separate organics for composting.

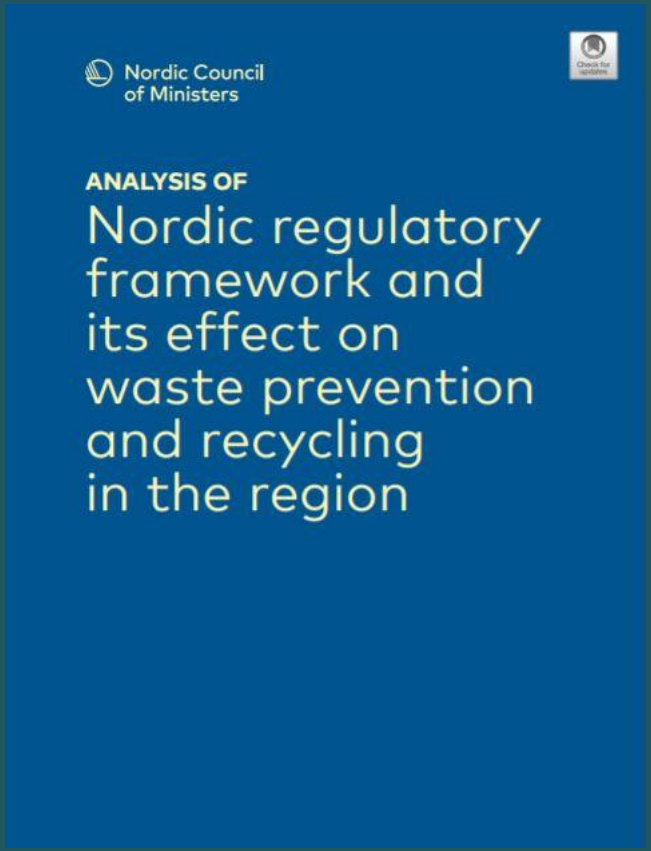
Policy Recommendations:

- those countries heavily dependent on landfills, should focus on rolling out effective separate collection, focus on organics and, in case they want to extract energy, look primarily at anaerobic digestion.

- those countries heavily dependent on incineration should raise taxes, end subsidies and other economic incentives, decommission old facilities and set up a moratorium for new ones.

"It's time to recognise that Waste-to-Energy incineration is a significant barrier to the circular economy because it burns valuable materials that could be recycled, composted or reused. Burning these resources comes at a high environmental and climate cost and given the urgent need to mitigate exacerbated climate change, we must phase out incineration as soon as possible to keep us below 1.5 degrees warming."

Janek Vahk, ZWE Climate, Energy and Air Pollution Programme Coordinator



The executive summary:
"The clearest area of required change will be a significant shift away from incineration (and in Iceland, landfilling) towards recycling."

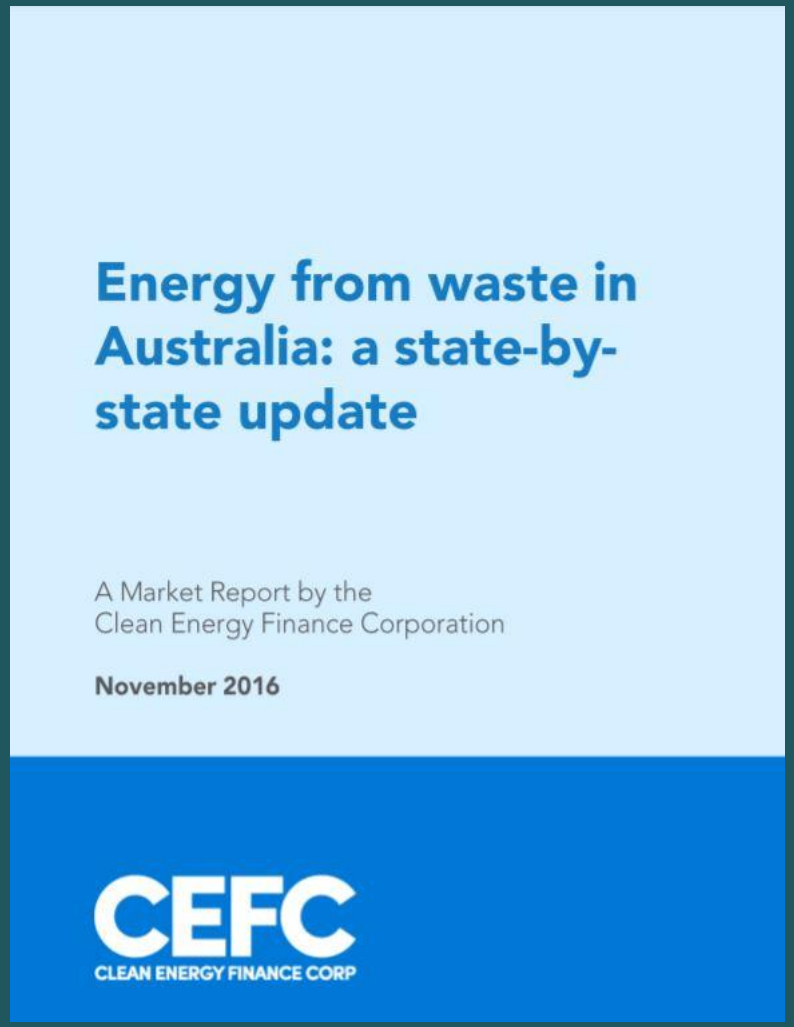
This is likely to include:

- a dramatic increase in coverage (both in terms of proportion on population covered and materials collected) of separate door-to-door collection of recyclables and biowaste;
- the introduction of more sorting capacity for mixed waste after separate collection has been maximised. This will help to capture more material for recycling (especially plastic) and to reduce the carbon intensity of municipal waste incineration fuels;
- the reform of policies that will help to drive this shift towards much higher rates of recycling, perhaps including:

- **increased taxes or bans on recyclable materials and biowaste entering incineration plants;**

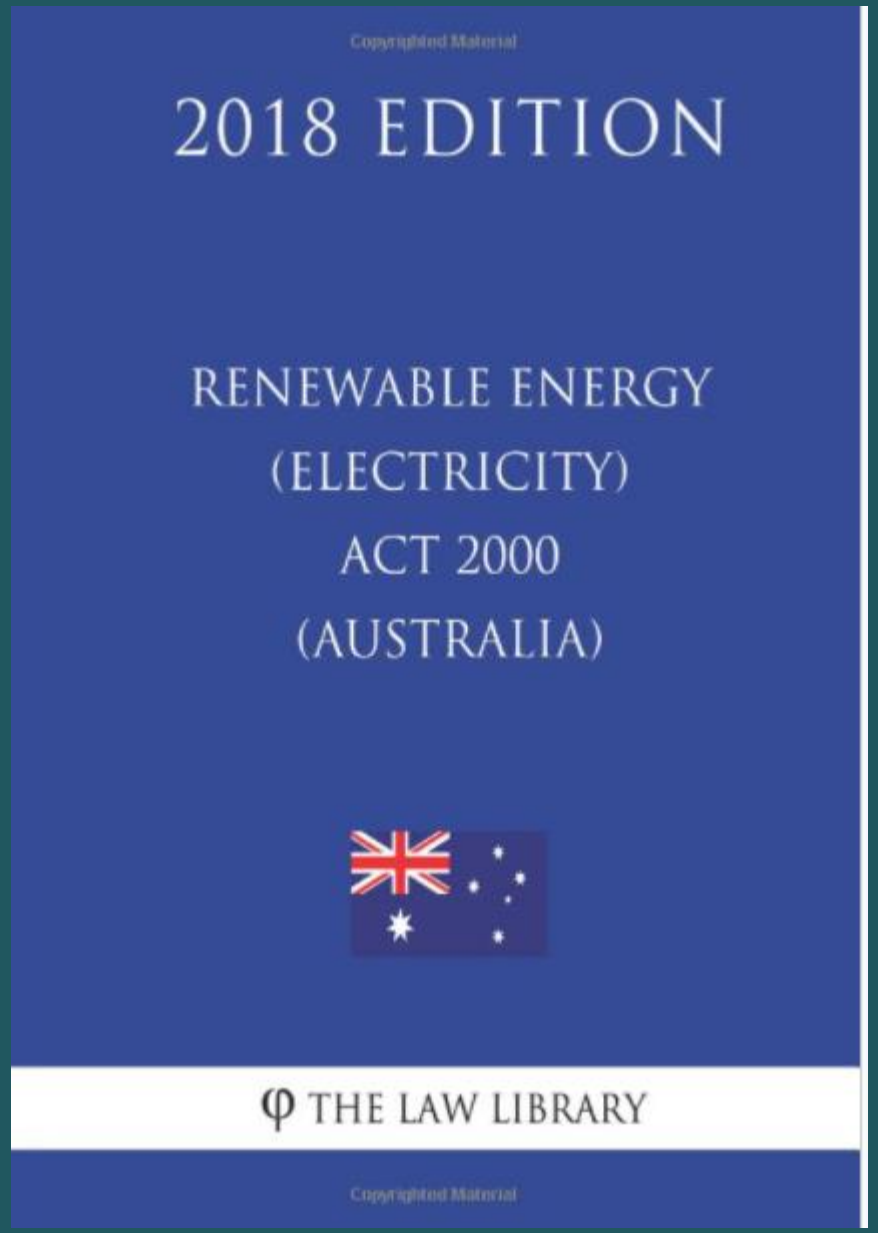
- reform of extended producer responsibility systems, regarding municipal waste especially in respect of packaging, this will be a requirement for EU Member States as a result of the 2018 revisions to the Waste Framework Directive with minimum requirements specified.

- the development of new recycling and biowaste infrastructure; and behaviour change interventions for very high material capture rates to be possible. This could include use of pay-as-you-throw systems or other communications initiatives backed by economic incentives (e.g. fines and surcharges) and enforcement.



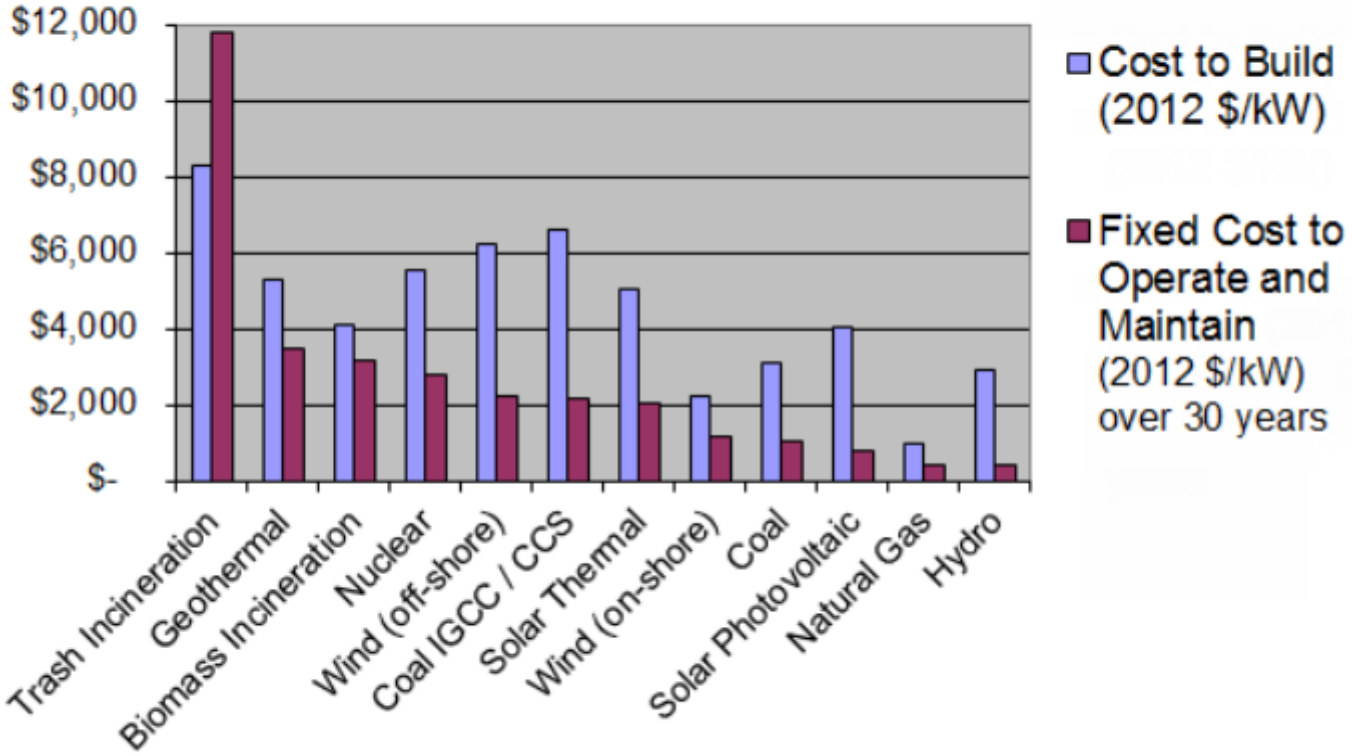
CEFC fund $50 million in the New Energy incinerator in Rockingham

CEFC funded $90 million to the Averta incinerator in Kwinana.



- energy crops;
- wood waste;
- agricultural waste;
- waste from processing of agricultural products;
- food waste;
- food processing waste;
- bagasse;
- biomass-based components of municipal solid waste; and
- biomass-based components of sewage;

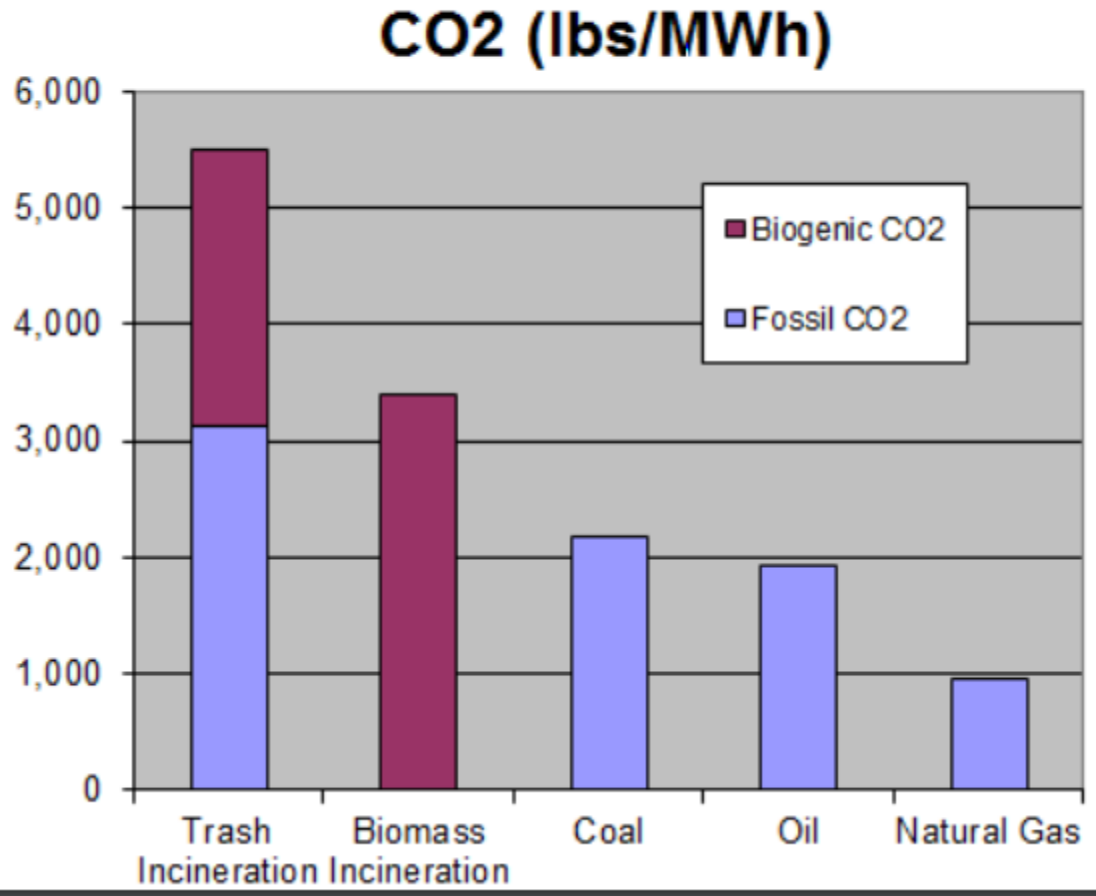
Most Expensive Way to Make Energy



Source: "Updated Capital Cost Estimates for Utility Scale Electricity Generating Plants," Energy Information Administration, April 2013, p.6, Table 1. Full report here: www.eia.gov/forecasts/capitalcost/pdf/updated_capcost.pdf

Global Warming Pollution

Smokestack CO2 Emissions from U.S. Power Plants



Data is in pounds of CO2 per unit of energy produced (lbs/MWh)

Source: U.S. EPA Emissions & Generation Resource Integrated Database (eGRID) v.9, released 2/24/2014 (2010 data)

The Wollongong SWERF: Solid Waste and Energy Recycling Facility

Opened amid much hype and expectation in February 2001, SWERF converted household organic matter from municipal waste into synthetic fuel gas and then into electricity.

It was to provide electricity for about 20,000 homes and achieve a 90 per cent reduction in waste going to landfill. But it never really got off the ground after experiencing engineering and technical difficulties.

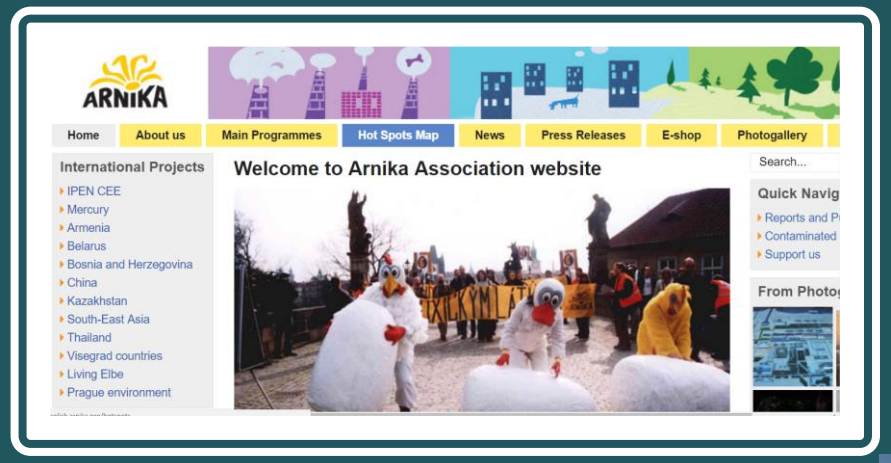
Energy Developments unsuccessfully tried to sell Brightstar Environmental in 2003 and in mid-2003

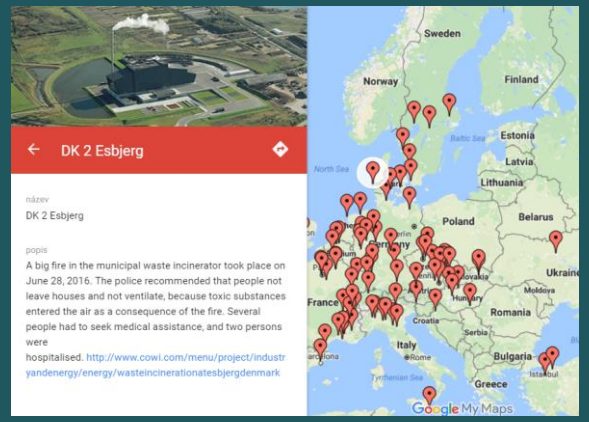
Energy Developments announced it would stop funding SWERF development activities.

In April 2004, Energy Developments abruptly announced the closure of the Wollongong facility.

Emissions tests in 2001 observed the following problems:

- result for sulfuric acid mist and/or sulfur trioxide was found at nearly twice the allowable limit in the facility's permit;
- arsenic exceeded the limit in the facilities permit;
- NOx emissions were high (tests showed 190-300 mg/m^3; as a comparison, the German NOx limit is 200 mg/Nm^3)
- carbon monoxide emissions were very high (tests showed 681 mg/m^3; as a comparison the German CO limit is 50 mg/Nm^3).
- The same tests found emissions of dioxin, hydrogen chloride, hydrogen fluoride, polyaromatic hydrocarbons, hexachlorobenzene, heavy metals, and other chemicals of concern.





Fos-sur-Mer France 2013

Dumfries Scotland 2013

Grenoble France, 2016

Lysa nad Labem, Czech Republic 2013

Fuzfo Hungary 2010

Rillieux la Pape, France, 12/11/2013

Esberg Denmark 2016

Sports Musique Loisirs Émissions

Un incendie sans gravité au centre de traitement des déchets de Grenoble

Lundi 9 mai 2016 à 22:00 - Par Xavier Demagny, France Bleu Isère, France Bleu

La fumée était impressionnante, mais l'incendie sans gravité. Ce lundi soir, des déchets ont brûlé dans une fosse de 1500 mètres carrés du centre d'incinération Athanor de Grenoble-Meylan (Isère).

La fumée était très noire au dessus d'Athanor. © Radio France - Léopold Dragno

Grenoble, France


Community health first
Dump Incinerator
WE CANT BURN OUR WAY OUT of CLIMATE
NO INCINERATORS
WESTERN SYDNEY NO RUBBISH DUMP
NO TOXIC INCINERATOR TO POISON US
DON'T MAKE US WHEEZE
WE WANT CLEAN AIR TO BREATHE


EPA =
Extra
Pollution
Approved
DONT
THE
is
dangerous


STOP INCINERATION
ZERO DECHET
WASTE IS

European Zero Waste City Case Studies