Proforma B

INQUIRY INTO 'ENERGY FROM WASTE' TECHNOLOGY

Name: Proforma B – Concerns about 'Energy from Waste' technology

Number received: 34 (in whole or in part)

Submission – Upper House Inquire into Energy from waste technology

TERMS OF REFERENCE

That Portfolio Committee No. 6 inquire into and report on matters relating to the waste disposal industry in New South Wales, with particular reference to 'energy from waste' technology, and in particular:

TERMS OF REFERENCE - A

The current provision of waste disposal and recycling, the impact of waste levies and the capacity (considering issues of location, scale, technology and environmental health) to address the ongoing disposal needs for commercial, industrial, household and hazardous waste.

SOLUTION - A

- Our whole waste disposal system is in need of an overhaul. Companies need to have financial incentives to reduce unnecessary packaging which ends up in landfill. There could be a system similar to the healthy food star system. If the product uses no packaging – they would get the highest environmental rating. If the product uses no plastic packaging, it could get the second highest rating and so on. This rating system could be used by shoppers to only buy products without packaging or without plastic packaging therefore reducing landfill. Those with a low rating such as one star could be charged a fee by the government. While those with 5 stars or the highest rating could have the 5 stars for no charge. This gives manufacturers an incentive to reduce their product packaging which would otherwise go to landfill. "Pollution control through financial incentives has a much greater impact on production processes than end-of-pipe abatement" http://siteresources.worldbank.org/DEC/Resources/Financialincentives.pdf

- If all councils supplied a composting bin along with the standard Recycling and Red bins landfill would be reduced by 40% per household, per week. (40% of the red bin contains food waste) http://www.hornsby.nsw.gov.au/property/waste-and-recycling/composting-and-worm-farming

- Another way to reduce landfill would be to ban single use plastic bags all together. Australians use 3.92 billion plastic bags a year, that's over 10 million new bags being used every day. An estimated 3.76 billion bags or 20,700 tonnes of plastic are disposed of in landfill sites throughout Australia every year. **Australians dump 7,150 recyclable plastic bags into landfills every minute or 429,000 bags every hour.** It is estimated that around 50 million bags enter the Australian litter stream every year. Unless they are collected, they remain in the environment and accumulate at a staggering rate. If these 50 million plastic bags were made into a single plastic sheet, it would be big enough to cover the Melbourne CBD.

- It is essential to explore the potential of environment-friendly technologies, like anaerobic digestion (AD), for the treatment of waste because it holds the promise to address two highly important environmental concerns – waste management and renewable energy.

- **Blacktown council currently has a recycling rate of 60% plus 40% diverted from landfill to compost bin equals 100% No need for a waste to energy incinerator to burn waste at Eastern Creek**

TERMS OF REFERENCE - B

The role of 'energy from waste' technology in addressing waste disposal needs and the resulting impact on the future of the recycling industry.

CONCERNS - B

- Incinerators undermine the recycling and reuse sector as they compete for the same resources. Waste incinerators provide few jobs compared to the waste recycling, composting and reuse sector. Incinerator projects would take scarce renewable energy subsidies from cleaner, more reliable and sustainable renewable

energy technologies such as wind, solar and wave technologies.

- The pollutants created by incineration, even if trapped, reside in filters and ash, which need special landfills for disposal. In case energy recovery is attempted, it requires heat exchangers which operate at temperatures which maximize dioxin production. If the gases are quenched, it goes against energy recovery. Such projects disperse incinerator ash throughout the environment which subsequently enter our food chain.

- Incineration has too many negative impacts on human health and environment. Emissions from incinerators can include heavy metals, dioxins and furans, which may be present in the waste gases, water or ash. Plastic and metals are the major source of the calorific value of the waste. The combustion of plastics, like polyvinyl chloride (PVC) gives rise to these highly toxic pollutants. Burning waste fuels based on petrochemicals (which are fossil fuels) and burning plastics derived from fossil fuels does not create 'green' energy – it is simply burning fossil fuels in another form. "The Renewable Energy (Electricity) Act 2000" specifically excludes electricity production from fossil fuel based materials such as plastics. **https://www.legislation.gov.au/Details/C2016C00624**

TERMS OF REFERENCE – C i

Current regulatory standards, guidelines and policy statements oversighting 'energy from waste' technology, including reference to regulations covering the European Union.

CONCERNS – C i

- The European Union has proven that pollution from incinerators can cause cardiovascular and respiratory diseases as well as cancer. It is the leading environmental cause of premature death in the European Union.

- A fact sheet written by the European Parliament on air and noise pollution shows the true facts of pollution from Waste Incinerators. The Union's long-term objective 'to achieve levels of air quality that do not have significant negative impacts on human health and the environment, is still at risk. In urban areas where the majority of Europeans live, air quality standards are often contravened. The most problematic pollutants today are fine particles, nitrogen dioxides and ground-level ozone (which are associated with waste to energy incineration)
  http://www.gov.scot/Publications/2002/08/15285/10400

TERMS OF REFERENCE – C ii

Current regulatory standards, guidelines and policy statements oversighting 'energy from waste' technology, including reference to regulations covering the United States of America.

CONCERNS – C ii

- The New York State Department of Environmental Conservation (DEC) presented some concerns. In the year 2000, mercury emissions from waste-to-energy facilities in New York were an average of six times higher than coal.

- The report also found waste-to-energy facilities "continue to emit most air pollutants at emission rates that are greater than coal-fired power plants on a per megawatt-hour (MWh) basis."
  https://www.scientificamerican.com/article/does-burning-garbage-to-produce-energy-make-sense/

TERMS OF REFERENCE – C iii

Current regulatory standards, guidelines and policy statements oversighting 'energy from waste' technology, including reference to regulations covering International best practice.

CONCERNS – C iii

- BAT Guidance Notes for the Waste Sector
  http://www.epa.ie/pubs/advice/bat/BAT%20Waste%20Transfer%20&%20Materials%20Recovery%20-%20Final%20Draft%20-%20December%202011%20.pdf

TERMS OF REFERENCE - D

Additional factors which need to be taken into account within regulatory and other processes for approval and operation of 'energy from waste' plants.

CONCERNS - D

- Several studies have demonstrated that old but also new incinerators can contribute to the contamination of local soil and vegetation by organic and inorganic compounds present in variable quantities in fly ash and flue gases released from the plants. Similarly, in several European countries, cow's milk from farms located close to incinerators has been found to contain elevated levels of dioxins, in some cases above regulatory limits [2, 3]. Populations living near incinerators - alike those living near landfill sites - are potentially exposed to chemicals by way of inhalation of contaminated air, consumption of contaminated foods, water or dermal contact with contaminated soil.

- Several epidemiological and experimental studies were conducted to evaluate adverse effects in populations or workers exposed to the emission of incinerators. Health effects that have been reported to be associated with environmental exposure to incinerator emissions include increased risk of a range of cancers (especially lung and larynx cancer, leukemia, lymphoma, soft tissue sarcoma), respiratory symptoms and congenital malformations. Some studies have also revealed a higher incidence of multiple births, abnormal sex ratio of newborns and changes in blood levels of some thyroid hormones.

- Incinerators are typically fed with mixed waste containing hazardous substances such as heavy metals and chlorinated organic chemicals. These substances can assume other forms during incineration that are likely to be more toxic than the original compounds. The range of metals emitted from the plants includes cadmium, thallium, lead, arsenic, antimony, chromium, cobalt, copper, manganese, nickel and mercury. Metal exposure is therefore associated with a range of adverse health effects concerning all body systems. In particular most heavy metals have been reported to be associated with kidney disease, respiratory diseases, cardiovascular damage, blood effects, and neurotoxicity. Some are classified as proven or suspected carcinogens. Some others are associated with particular health effects: lead acts as a modifier of children's cognitive and behavioural development, long term exposure to cadmium is likely to be responsible for disturbances in calcium metabolism and osteoporosis.

- Airborne particles, nitrogen dioxide, sulphur dioxide and carbon monoxide are among pollutants emitted from incinerators. PM10 is generally considered as the most important component of urban air pollution and epidemiological studies have shown that long-term exposure to airborne particles is associated with increased risks of developing bronchitis and loss of life expectancy. Furthermore particle traps used to reduce particle emission from incinerators cannot avoid emission of ultra-fine particles.

- The aim of this study is to present a review of the major epidemiological studies published from 1987 to 2003 on health effects in populations living in the neighbourhood of waste incinerators. Forty-six papers were considered: 32 concerning health effects on populations residing near incinerators, 11 on occupational exposure, 2 on environment and occupation and 1 was included as its environmental survey was designed to evaluate the relationship between a high cancer death rate and environmental concentration of dioxin analogues near an incinerator in Japan. To enrich evidence on association between some diseases and exposure to compounds emitted by incinerators, papers on occupational exposure were also included in this review.

- Analysis has found significant links between exposure to Incinerators and lung cancer, non-Hodgkin lymphoma, soft tissue sarcomas and childhood cancers. Some results also pointed out the relationship between exposure to incinerators and congenital malformations.
  http://www.hia21.eu/dwnld/20131216_Health%20effects%20of%20exposure%20to%20waste%20incinerator%20emissions.pdf

TERMS OF REFERENCE - E

The responsibility given to state and local government authorities in the environmental monitoring of 'energy from waste' facilities.

CONCERNS - E

- Energy from waste incineration should not even be considered. The threat to human health is just to great.

TERMS OF REFERENCE - F

Opportunities to incorporate future advances in technology into any operating 'energy from waste' facility.

CONCERNS - F

- Incinerators stifle innovation. Long contracts are required to make the industry viable and secure waste streams. This impedes the development and approval of newer, cleaner technologies.

- Energy from waste incineration should not even be considered. The threat to human health is just to great.

TERMS OF REFERENCE - G

The risks of future monopolisation in markets for waste disposal and the potential to enable a 'circular economy' model for the waste disposal industry

CONCERNS - G

- Waste incinerators entrench a linear economy that relies on the extraction of finite raw materials. Our society needs to move rapidly to a sustainable circular economy so as to preserve finite resources for future generations, reduce pollution and toxic ash legacies and secure a viable and sustainable waste management system.

TERMS OF REFERENCE - H

Any other related matter

CONCERNS - H

- A lot more energy is saved by reusing materials instead of destroying them. Framing this whole debate as incineration versus landfills, is putting us back 20 years. Twenty years ago, people used to say we need to do more recycling; now we're talking about more burying or burning. The alternative to incineration, biomass could be composted and used for energy recovery.

- In relation to waste to energy incineration the precautionary principle needs to be applied. It was specified in the Intergovernmental Agreement on the environment which was signed on the 1st May 1992 by the Federal, State and Territory governments and the Australian local governments association. The precautionary principle was stated in cl 3.5.1 of the agreement in these terms; Where there are threat of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

- The main objectives of waste to energy incineration are **"To offer a viable alternative to the burning of fossil fuels by utilising a green and renewable energy source)** These objectives will not be met by burning waste fuels based on petrochemicals (which are fossil fuels) and burning plastics derived from fossil fuels does not create 'green' energy – it is simply burning fossil fuels in another form. This does not comply with "The Renewable Energy (Electricity) Act 2000, which specifically excludes fossil fuel based materials such as plastics.

- The European Union has proven that pollution from incinerators can cause cardiovascular and respiratory diseases as well as cancer. It is the leading environmental cause of premature death in the European Union. Certain substances, such as arsenic, cadmium, nickel and polycyclic aromatic hydrocarbons, are human genotoxic carcinogens (GTX); Meaning most GTX carcinogens are electrophiles that interact directly with DNA through the formation of covalent bonds, resulting in DNA-carcinogen complexes (DNA adducts). These complexes lead to various types of DNA damage, including the formation of cross-links between the two helices, chemical bonds between adjacent bases, removal of DNA bases (hydration) and cleavage of the DNA strands, all of which result in modifications to the information stored within the DNA. Such mutations are

typically fixed by DNA repair mechanisms; however, if DNA replication occurs prior to the action of a repair mechanism, mutations can become permanent and may eventually cause tumors (*Scientific Reports* **3**, Article number: 2783 (2013) Distinguishing between genotoxic and non-genotoxic hepatocarcinogens by gene expression profiling and bioinformatic pathway analysis) http://www.nature.com/articles/srep02783 There is no identifiable threshold below which they do not pose a risk.

- Waste to Energy incineration has negative impacts on the quality of water - leading to soil and groundwater pollution and damage to the ecosystems through eutrophication (Eutrophication is a leading cause of impairment of many freshwater and coastal marine ecosystems in the world e.g From acid rain and excess nitrogen pollution).

- Australia' existing policy on Ultrafine Particulates only relates to particulates larger than PM2.5. There is no current regulatory legislation for ultrafine or nanoparticles, which are known to be emitted in high amounts in all types of incinerators and can be less than PM0.1. Research on ultrafine and nanoparticles of PM0.1 - PM2.5 need to be researched for health (effects associated) and environmental effects (such as effect on rainwater tanks, and home grown produce) and a policy needs to be written before any incinerators are approved. Australia needs to develop their own policies on Thermal Waste Incinerators. The 16 year old European Union policy being followed is outdated and has proven to be a failure in terms of human health and air emissions.

- An operational incinerator would require an addition of 614 vehicles in the area each day (based on proposed Eastern Creek Incinerator EIS) creating additional air pollution in the form of Hydrocarbons & Nitrogen oxides (NOx), which react in the presence of sunlight to form ground level ozone. This gas irritates the respiratory system, causing coughing, choking, and reduced lung capacity. These pollutants cause lung irritation and weaken the body's defenses against respiratory infections such as pneumonia and influenza. Carbon monoxide (CO) CO blocks oxygen from the brain, heart, and other vital organs. Fetuses, newborn children, and people with chronic illnesses are especially susceptible to the effects of CO. The Environmental Protection Agency estimates that the air toxics emitted from cars and trucks — which include Benzene, acetaldehyde, and 1,3-butadiene — account for half of all cancers caused by air pollution. A report released Saturday 21st January 2017 by the Committee of Sydney shows Blacktown (the area proposed for Eastern Creek waste to energy incinerator) as an area of high rates of cardiovascular disease and Incinerator emission will only increase these rates further.

- Bottom or fly ash contains toxic Air Pollution Control (APC) residues, which are very fine grained powder, ranging from light grey to dark grey. The main environmental concern with respect to APC residues is leaching of: Easily soluble salts such as Cl and Na. Heavy metals such as Cd, Cr, Cu, Ni, Pb, and Zn. Heavy metals and trace elements can potentially be present in concentrations harmful for humans as well as for ecosystems. As such, leaching of these components has generally been the primary concern. Although dioxins and furans do not easily leach, release of these contaminants is of major concern because of their toxicity. Across the world APC residues are being landfilled and stored in old salt mines. This is not a long term solution. Solid residues from Waste-to-Energy facilities constitute the primary emission route to the surrounding environment. Bottom ashes are generated in larger quantities, the main pollution potential is found in the air-pollution control (APC) residues originating from cleaning the flue gases before emission to air. While a range of different types of APC residues exists the overall properties and environmental concerns are the same, regardless of the incinerator and country of origin. Currently, no general consensus appears to exist regarding disposal solutions on a worldwide level. In the long run we will run out of places to store APC residue. Metal leaching from residues after final disposal may continue for thousands of years.

- Proponents with extensive environmental breaches should not be considered to operate a waste to energy incinerator.

- The **World Health Organization** list seven health hazards associated with noise pollution from Incinerators; hearing impairment, sleep disturbances, disturbances in mental health, cardiovascular disturbances,

interference with spoken communication, impaired task performance, negative social behavior and annoyance reactions. Families living around the site of an incinerator should not have to put up with noise disturbances 24/7.

- This study was completed to present a review of the major epidemiological studies published from 1987 to 2003 on health effects in populations living in the neighbourhood of waste incinerators. Forty-six papers were considered: 32 concerning health effects on populations residing near incinerators, 11 on occupational exposure, 2 on environment and occupation and 1 was included as its environmental survey was designed to evaluate the relationship between a high cancer death rate and environmental concentration of dioxin analogues near an incinerator in Japan. To enrich evidence on association between some diseases and exposure to compounds emitted by incinerators, papers on occupational exposure were also included in this review.
The Conclusion of this study; Chemical emissions of modern incinerators are more limited but toxic substances are still released in the atmosphere as well as in other residues such as fly ash and bottom ash. The study also showed an association with those exposed to incinerators showing significant results for lung cancer, non-Hodgkin lymphoma, soft tissue sarcomas and childhood cancers.
http://www.hia21.eu/dwnld/20131216_Health%20effects%20of%20exposure%20to%20waste%20incinerator%20emissions.pdf