

## CHAPTER 3

### INCINERATION

3.1 Although the Committee considers that waste minimisation and recycling are the preferred options, it was argued that this approach would not provide all of the answers in the immediate future. While the policies of waste minimisation may have an impact on the future accumulation of waste materials, there remains the problem of waste produced by past and interim activities while these policies are being implemented. The Committee considers that the use of incineration should only be considered after waste minimisation strategies have reduced the amount of waste produced by as much as is practicable.

3.2 The purpose of incineration is to decrease the volume going to landfill, to recover energy and to destroy pollutants.<sup>1</sup> It is stressed that in the context of achieving the 50 per cent reduction in waste by the year 2000, incineration of waste must be counted as replacing landfill and must not be considered a substitute for reductions in the amount of waste produced.<sup>2</sup> The Committee strongly supports this view. The goal should be the reduction of waste rather than the volume going to landfill.<sup>3</sup>

3.3 Incineration is the process of using combustion to treat or dispose of waste materials. Combustion is the thermal processing of solid waste by chemical oxidation with air. Incineration is the controlled combustion

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<sup>1</sup> du Plessis, L (1993) *Incineration of Municipal Waste* Paper presented the NCC Waste Crisis Network Seminar in Sydney on 25 September 1993, p.1.

<sup>2</sup> Allen P (1993) 'What is the responsible role for incineration in waste management?' *Incineration an option for waste management* Proceedings of a seminar on incineration of domestic waste, Commonwealth Environment Protection Agency, Pavillion Hotel Canberra, 30 November 1993, p.92.

<sup>3</sup> Timmiss, Evidence, p.347.

of fuel to convert the organic content to residues and gases.<sup>4</sup> The end products include hot combustion gases and non-combustible residue.<sup>5</sup>

3.4 Incineration falls into two major categories: the destruction of scheduled materials and the disposal of municipal wastes. The discussion provided in this chapter will relate to the incineration of municipal waste unless otherwise stated. High Temperature incineration is discussed in Chapter 5 in relation to destruction of scheduled wastes.

3.5 It was claimed that by using combustion, the volume of municipal waste going to landfill could be reduced by up to 95 per cent.<sup>6</sup> Greenpeace Australia pointed out that the reduction in volume of 90 per cent often cited is probably 60 to 70 per cent at sites where compaction is used.<sup>7</sup>

3.6 In Western Europe combustion is the second most common form of waste disposal and in some countries exceeds 50 per cent.<sup>8</sup>

Country	% Municipal Solid Waste
Denmark	65
Sweden	55
France	42
Netherlands	40
Germany	30
Singapore	85
Australia	<1

<sup>4</sup> Department of Environment, Sport and Territories, Submission No.69, p.8.

<sup>5</sup> Packaging Council of Australia Inc (1993) 'Combustion With Energy Recovery', *Issues Paper*, Issue No.1., August 1993, p.1.

<sup>6</sup> Ibid, p.1.

<sup>7</sup> Cartmel, Evidence, p.402.

<sup>8</sup> Packaging Council of Australia (1993) 'Combustion With Energy Recovery' *Issues Paper*, August 1993, Issue No.1, p.1.

3.7 The Waverley Woollahra Process Plant in Sydney and the Antarctic Territories operate the only incinerators of domestic waste in Australia.<sup>9</sup> The Committee was told that the low usage in Australia is attributed to the public perception that incinerators are polluting and a political reluctance to grasp the issue.<sup>10</sup>

3.8 A number of submissions comment on the public opposition to the siting of incinerators.<sup>11</sup> Incineration of hazardous wastes in particular has received a great deal of bad publicity in Australia. Consequently:

the perceived risks associated with incineration have resulted in such widespread public opposition that any process resembling incineration in any way is liable to be rejected on the basis of its similarity rather than on a scientific assessment.<sup>12</sup>

3.9 Modern incinerators perform better against environmental standards.<sup>13</sup> They have extensively sorted waste feed and therefore favour recycling.<sup>14</sup> The ash is far less dangerous and is therefore easier to dispose of.<sup>15</sup> The ash residue which is not toxic can be used in saleable cement products.<sup>16</sup> Once an ash is considered hazardous, waste tipping fees rise dramatically.<sup>17</sup>

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<sup>9</sup> Department of Environment, Sport and Territories, Submission No.69, p.23.

<sup>10</sup> Packaging Council of Australia (1993) 'Combustion With Energy Recovery' *Issues Paper*, August 1993, Issue No.1, p.2.

<sup>11</sup> For example, Logan City Council, Submission No.66, p.2.

<sup>12</sup> CRA Limited and the University of Western Australia, Submission No.16, p.3.

<sup>13</sup> Gutteridge, Evidence, p.300.

<sup>14</sup> Hyman, Evidence, p.86.

<sup>15</sup> Ibid, p.86.

<sup>16</sup> Gutteridge, Evidence, p.305.

<sup>17</sup> Denlay, Evidence, p.505.

3.10 Some components of domestic waste are considered not to be recyclable but could be incinerated. Items such as those listed below for the Sydney area:<sup>18</sup>

Material	Kg/person/annum
Soiled paper and cardboard	19
Disposable napkins	3
Cans neither aluminium nor steel	3
Wood, textiles, rubber, footwear	13
Ceramics, dust, ashes, rock	11

### *Environmental Impacts*

3.11 The Department of Environment, Sport and Territories listed the following potential environmental impacts of incineration:

- effect of emissions on public health;
- impacts on the amenity of the area;
- risks and hazards;
- detrimental effects on cultural and heritage values;
- detrimental effects on air, land and water quality;
- adverse effects on ecological values; and
- increased traffic.<sup>19</sup>

3.12 The Friends of the Earth also outlined a number of disadvantages of incineration, including the following:<sup>20</sup>

- residual ash may need special disposal;
- production of dioxins and furans;

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<sup>18</sup> Total Environment Centre, *Sydney's Waste Crisis Proposals for Resolution*. Submission by Total Environment Centre to the NSW Parliamentary Joint Select Committee Upon Waste January 1993, p.14.

<sup>19</sup> Department of Environment, Sport and Territories, Submission No.69, p.29.

<sup>20</sup> Dr Heydemann, Minister of the Environment in Schleswig-Holstein, Germany cited by Friends of the Earth, Submission No.48, p.6.

- unknown potentially dangerous substances;
- costs of meeting emission standards;
- energy recovery is small;
- incineration is irreversible;
- potential disincentive to recycling; and
- used to maximum once constructed.

### *Emissions*

3.13 Potential pollutants from incineration include fly ash and associated heavy metals; volatile heavy metals (mainly mercury); hydrochloric acid and fluorides; carbon dioxide; dust and particulates; sulphur and nitrogen oxides, carbon monoxide and organic micropollutants and dioxins.<sup>21</sup> The Committee was told that while incineration can destroy combustible pollutants, it also produces hydrogen chloride, nitrogen oxides, dioxins (polychlorinated dibenzodioxin) and furans (polychlorinated dibenzofurans).<sup>22</sup>

3.14 Greenpeace Australia pointed out that the emissions from incinerators include:

nitrogen oxides, which contribute to acid rain and urban smog; sulphur dioxide and hydrogen chloride, which are two other acidic gases; carbon monoxide; chlorine dioxide, which is linked to global warming; very fine particulate matter, the inhalation of which causes problems; toxic heavy metals; and a range of dangerous organic compounds, in which you can find things such as dioxins and furans.<sup>23</sup>

3.15 Coal fired power stations, incineration and landfill would produce the same amount of CO<sub>2</sub> without any energy being produced unless

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<sup>21</sup> Robertson G (1993) *Incineration With Energy Recovery of MSW: The biofuel of the 21st century*. Paper presented to the Asian Industrial Technology Congress '93 Conference on Environmental and Related materials Technology, Hong Kong 21-22 May 1993, p.4; Department of Environment, Sport and Territories, Submission No.69, p.32.

<sup>22</sup> du Plessis L (1993) *Incineration of municipal waste*. paper presented to the NCC Waste Crisis Network Seminar in Sydney on 25 September 1993.

<sup>23</sup> Cartmel, Evidence, p.402.

waste to energy schemes were introduced for the latter two processes.<sup>24</sup> Greenhouse emissions from waste to energy plants are 81 per cent less than from landfill.<sup>25</sup>

3.16 The emission standards adopted by Germany are generally considered to be the benchmark for the rest of the world.<sup>26</sup> These set the new standards as less than 10 per cent of previous levels for acid gases, particulates, heavy metals and nitrous oxides, and include new pollutants such as dioxins and furans.<sup>27</sup> The Committee was told that the emissions out of these modern plants are lower than the average motor car or wood burning fires insofar as they contribute to the total pollution load.<sup>28</sup>

3.17 It is anticipated that Australian emission standards will be influenced by the standard of 0.1 ng/m<sup>3</sup> TEF (toxic equivalent factor).<sup>29</sup> Tests on the Waverley Woollahra Process Plant in 1990 showed that dioxins levels in the emissions were 3.8ng/m<sup>3</sup> which compares to the emission standards in Germany of 0.1ng/m<sup>3</sup>.<sup>30</sup> The Committee was assured that modern waste to energy plants can comfortably operate within the German limits.<sup>31</sup>

3.18 It is interesting to note that if the German standards were applied to other energy generating facilities, all power stations would be closed,

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<sup>24</sup> Toxic Chemicals Committee, Total Environment Centre Inc, Submission No.36, p.6.

<sup>25</sup> Australian National Industries Ltd, Submission No.27, p.31.

<sup>26</sup> Waverley and Woollahra Councils, Submission No.61, p.5.

<sup>27</sup> Ibid, p.5.

<sup>28</sup> Gutteridge, Evidence, p.303.

<sup>29</sup> Department of Environment, Sport and Territories, Submission No.69, p.35.

<sup>30</sup> Zetland Community Action Group, Submission No.28, Attachment 1, *Incineration no alternative*, p.1.

<sup>31</sup> Ferguson C (1993) 'Technical aspects of incineration' *Incineration an option for waste management*. Proceedings of a seminar on incineration of domestic waste, Commonwealth Environment Protection Agency, Pavillion Hotel Canberra, 30 November 1993, p.52.

most fuel burning industries would shut and even the crematoriums would cease operations.<sup>32</sup> The point was made that there should be no difference between the emission standards required for coal burning power generators and power plants that burn waste.

3.19 Dr Robertson pointed out that:

There are no logical reasons to set stricter emission limits for waste fuels than for coal, oil, natural gas, etc. If extreme standards are set for waste incinerators, then incineration will have to be replaced by other methods of energy production which could lead to higher pollution and the consumption of non-renewable fossil fuels.<sup>33</sup>

3.20 The amount of dioxins formed during incineration is dependent on the amount of chlorine and copper in the waste and the rapidity in which the temperature of stack gases can be dropped through the 'window' temperatures of maximum dioxin formation.<sup>34</sup> Dioxins are therefore formed when burning materials such as PVC plastics and chlorine bleached paper. The Zetland Community Action Group pointed out that in the early 1970s when the incinerator was constructed there was much less plastic and the health effects of dioxins were not realised.<sup>35</sup> It is impossible to predict the products of the future that may become part of the municipal waste stream and the effects of incinerating these products.

3.21 Health effects such as the skin disorder chloracne, potential effects on birth defects and the promotion of cancer have been

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<sup>32</sup> Ibid, p.51.

<sup>33</sup> Robertson G (1993) *Incineration With Energy Recovery of MSW: The biofuel of the 21st century*. Paper presented to Asian Industrial Technology Congress '93 Conference on Environmental and Related Materials Technology, Hong Kong 21-22 May 1993, p.4.

<sup>34</sup> Winder C (1993) 'Community and health concerns about emissions from municipal solid waste incinerators' *Incineration an option for waste management*. Proceedings of a seminar on incineration of domestic waste, Commonwealth Environment Protection Agency, Pavillion Hotel, Canberra, 30 November 1993, p.58.

<sup>35</sup> Zetland Community Action Group, Submission No.28, Attachment 1 *Incineration is no alternative*, p.1.

associated with dioxins and furans.<sup>36</sup> The Commonwealth Department of Human Services and Health is developing a set of principles on the interplay between environmental factors and health to guide government policy making on health issues.<sup>37</sup>

3.22 The results of the *Cancer Incidence by Local Government Area and Health Region in New South Wales*<sup>38</sup> study were not sufficiently detailed to identify specific areas such as Waterloo or Zetland.<sup>39</sup> The problems in diagnostic practices, notification and problems of small populations may affect the quality of the data.<sup>40</sup> Symptoms of sore eyes, increased incidence of coughs and flu, tightness in the back of the throat are the real symptoms experienced by people living close to incinerators but are rarely recorded in medical statistics.<sup>41</sup>

3.23 A number of pollutants which are found in incinerator emissions are also formed when any materials are burned, such as forest fires, domestic fires, from car exhausts and from industrial processes.<sup>42</sup> Dioxins which are present in food account for 90 per cent of human exposure. They are also released from landfill sites during the early stages of decomposition.<sup>43</sup> In North America, emissions from municipal

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<sup>36</sup> Department of Environment, Sport and Territories, Submission No.69, p.33.

<sup>37</sup> *Environment Management*, National Affairs, August 1994, p.5.

<sup>38</sup> Coates M, Smith D, Taylor R and McCredie M (1993) *Cancer Incidence by Local Government Area and Health Region in New South Wales 1985-1989*. NSW Central Cancer Registry, Sydney.

<sup>39</sup> Winder C (1993) 'Community and health concerns about emissions from municipal solid waste incinerators' *Incineration an option for waste management* Proceedings of a seminar on Incineration of domestic waste, Commonwealth Environment Protection Agency, Pavillion Hotel Canberra, 30 November 1993, p.67.

<sup>40</sup> Ibid, p.67.

<sup>41</sup> Ibid, p.67.

<sup>42</sup> Ibid, p.64.

<sup>43</sup> Department of Environment, Sport and Territories, Submission No.69, p.34.



incinerators contribute about one per cent of the total environmental dioxin levels.<sup>44</sup>

3.24 The example was given of dioxin levels in Germany where it is estimated that 15 kilograms of dioxins are emitted annually.<sup>45</sup> A reduction in the emission levels from incinerators by a factor of 10 meant that 360 grams less dioxin escaped into the atmosphere.<sup>46</sup> One company alone spent 120 million marks on their incinerators.<sup>47</sup> The remaining dioxins are emitted from motor vehicles and a range of other industries such as the steel industry.<sup>48</sup>

3.25 The Department of Environment, Sport and Territories considered that:

The risks from other exposures, such as chlorobenzenes, formaldehyde, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), nitrogen oxides, acid gases, arsenic, mercury, lead, cadmium and chromium are ten to a thousand times lower than the risks from CDDs [dioxins].<sup>49</sup>

3.26 Emissions standards are being reviewed by most jurisdictions in Australia. This is creating considerable uncertainty for government and industries wishing to construct incinerators. The Committee was told that:

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<sup>44</sup> Winder C (1993) 'Community and health concerns about emissions from municipal solid waste incinerators' *Incineration an option for waste management*. Proceedings of a seminar on incineration of domestic waste, Commonwealth Environment Protection Agency, Pavillion Hotel Canberra, 30 November 1993, p.58.

<sup>45</sup> Davies, Evidence, p.114.

<sup>46</sup> Ibid, p.114.

<sup>47</sup> Ibid, p.114.

<sup>48</sup> Ibid, p.114.

<sup>49</sup> Winder C (1993) 'Community and health concerns about emissions from municipal solid waste incinerators' *Incineration an option for waste management*. Proceedings of a seminar on incineration of domestic waste, Commonwealth Environment Protection Agency, Pavillion Hotel, Canberra, 30 November 1993, p.59.

The very frequent changes in emission standards during the past few years in some countries have obviously checked the investment in new plants because of the uncertainty about costs involved in having to meet new standards at some future time.<sup>50</sup>

3.27 There have been a number of advances in technology which have substantially improved the operations of incinerators. For example, combustion is more complete and can be controlled to avoid the formation of dioxins and furans, thermal efficiency is higher, the ash bed is sterile and can be used in fill applications and roadbase, the fly ash can be used in concrete, and residuals and emissions meet higher standards.<sup>51</sup>

3.28 Greenpeace Australia told the Committee that the Canadian national incinerator testing and evaluation program showed that, as increased controls are imposed on stack emissions, the concentration of several toxic metals in and their potential to seep out of the ash increased.<sup>52</sup>

3.29 The other issue in Australia is the lack of resources of States and Territories to monitor the levels of pollutants so that even though strict standards can be imposed, they cannot be enforced. The Committee was told that the Queensland Government set the levels for incinerators based on the Victorian EPA standards but were not able to test it and there was no random testing.<sup>53</sup>

### *Operation of Incinerators*

3.30 A point that is of concern to the Committee is that if the incinerators are constructed to meet the highest standards, that the

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<sup>50</sup> Robertson G (1993) *Incineration With Energy Recovery of MSW: The biofuel of the 21st century*. Paper presented to Asian Industrial Technology Congress '93 Conference on Environmental and Related materials Technology, Hong Kong 21-22 May 1993, p.4.

<sup>51</sup> Australian National Industries Ltd, Submission No.27, p.3-4.

<sup>52</sup> Cartmel, Evidence, p.402.

<sup>53</sup> Haines, Evidence, p.579.

operation of the incinerators must also ensure that those standards are maintained. It is essential that during its normal operation that specific operating requirements be met or the incinerator be shut down for repair.

3.31 Mr Ossipoff emphasised the three components for running a successful incinerator are the equipment, the procedures and rules and the people employed.<sup>54</sup> Mr Nataatmadja pointed out that a number of incinerators had been abandoned because they could not be made to perform as anticipated.<sup>55</sup> Dr P Connett has a video of incinerator bottom ash that contains readable newspaper and vegetable scraps.<sup>56</sup>

3.32 In relation to the claims that incinerators can now meet very high standards, the Department of Environment, Sport and Territories pointed out:

While such assurances might be scientifically based, incinerators, like other technologies, are prone to failure due to design fault or human error. Understandably, the community retains reservations about the hazards and degree of risk presented by such facilities.<sup>57</sup>

3.33 Dr Ogilvie outlined a number of problems in relation to the operation of incinerators:

Nearly all incinerators are operated at too low a temperature - perhaps to reduce fuel and/or refractory costs, perhaps unexpectedly wet waste is being fed in, perhaps temperature controllers and recorders need servicing etc....

The amounts of the principal organic hazardous constituents (POHC) in the materials leaving an incinerator are several orders of magnitude higher than calculations predict....Possible reasons for this include

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<sup>54</sup> Ossipoff, Evidence, p.337.

<sup>55</sup> Nataatmadja, Submission No.71, p.7.

<sup>56</sup> Denlay J (1993) 'Waste minimisation - the sustainable option' *Incineration an option for waste management*. Proceedings of a seminar on incineration of domestic waste. Commonwealth Environment Protection Agency, Pavillion Hotel, Canberra, 30 November 1993, p.42.

<sup>57</sup> Department of Environment, Sport and Territories, Submission No.69, p.33.

oxygen deficient pathways for the POHC's through the incinerator and chemical reactions re-forming POHC's as the output gases etc cool down as they leave the hot zone.

An incinerator is not a 'fail safe' device. For example an oversupply of waste to it will result in untreated waste in its output.....people fear the possible fallout from faulty operation of such a central facility if it is to process large amounts of waste containing a proportion of hazardous material.<sup>58</sup>

3.34 Australia does not have a good track record in relation to the operation of incinerators. The Healey Management Group pointed out that:

Unfortunately, in the past, there have been a number of incinerators which failed to achieve reasonable performance, and Australia has its fair share. The Mono-hearth plant at Moe, the Prahran moving grate, the old Woollahra incinerator at Cooper Park, and the Burley Griffin plant at North Sydney all were forced to close down due to poor performance and public pressure.<sup>59</sup>

3.35 Incinerators are currently operating in a number of countries in Europe which have very stringent environmental standards, therefore incineration is a demonstrated technology. Emissions can be less of a problem than what goes into incinerators if adequate controls are used.

3.36 The Committee was told that there were myths based on the consideration of only the emissions aspects of incineration.<sup>60</sup> The example was given that the spillage of one litre of influent per day could significantly reduce the efficiency of the incineration process.<sup>61</sup>

3.37 Greenpeace Australia spokesperson, Mr Cartmel, told the Committee that there was a misconception about household and trade

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<sup>58</sup> Ogilvie, Submission No.19, p.3.

<sup>59</sup> Healey Management Group, Submission No.6, p.7.

<sup>60</sup> Wall B (1992) *Report on Study Tour Examining Hazardous Waste Technologies*. October 1992, p.5.

<sup>61</sup> Ibid, p.5.

waste being non-hazardous.<sup>62</sup> In reality, there are contaminants in the form of cadmium and mercury batteries, old drugs, glues, solvents, chlorinated plastics, inks, dyes and other wastes which could combine chemically under the temperatures found in an incinerator to form new and more dangerous compounds.<sup>63</sup>

### *Size of Incinerator*

3.38 Another major aspect of community concern was in relation to a proposed central facility which would result in large amounts of waste being transported to that site across long distances and effectively concentrating the risk at that site.<sup>64</sup> There was an ideological goal among some councils that waste should be disposed of where it was generated.<sup>65</sup>

3.39 There needs to be a balance between the size of any proposed incinerator and the problems relating to the transport of materials:

a large incinerator operating continuously produces only a minute fraction of the toxic releases accompanying cold startups of a small incinerator.<sup>66</sup>

3.40 Another argument for the central location of facilities rather than a number of smaller ones is that the concentration of analytical laboratory resources and trained personnel are most economical and practical for a large facility.<sup>67</sup> A number of smaller incinerators rather

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<sup>62</sup> Cartmel, Evidence, p.401.

<sup>63</sup> Cartmel, Evidence, p.401.

<sup>64</sup> Hyman, Evidence, p.80.

<sup>65</sup> Healey Management Group, Submission No.6, p.3.

<sup>66</sup> Dalite Holding Pty Inc, 'The Use of Incineration as a Means of Disposal of waste and Energy Recovery'. Submission prepared by Hetzler F and Koenig R, Submission No.15, p.4.

<sup>67</sup> Dalite Holding Pty Inc, 'Hazardous Waste Treatment Technology' Submission prepared by Hetzler F and Koenig R, Submission No.15, p.2.

than a large central facility can, however, lead to difficulties in relation to control and regulation.<sup>68</sup>

3.41 In the USA, waste companies have been given permits to build incinerators in return for guarantees of minimum monthly or annual waste tonnage at a specified fixed cost.<sup>69</sup> If waste minimisation and recycling schemes are successful this may mean a significant drop in the volume of waste available to the incinerator. It was suggested that large incinerators would need to acquire new sources of waste to meet their throughput.<sup>70</sup>

3.42 There was some concern that an incinerator is a large scale investment that would make it difficult to update as environmentally superior processes are developed. The Committee was also told that the building of a municipal waste incinerator would impede the rezoning and reuse of land for 20-40 years, thus effectively restricting urban consolidation and medium density housing.<sup>71</sup>

3.43 Another factor to be considered in the establishment of a new facility is the net increase in chemical burden on the environment when it replaces the existing sources of discharge.<sup>72</sup>

3.44 It was suggested that consideration of a relocatable incinerator should not be ruled out in situations where this was the only method of disposal at a reasonable cost.<sup>73</sup> One area where the use of a mobile

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<sup>68</sup> Nataatmadja, Submission No.71, p.7.

<sup>69</sup> Dalite Holding Pty Inc, 'The Use of Incineration as a Means of Disposal of waste and Energy Recovery'. Submission prepared by Hetzler F and Koenig R, Submission No.15, p.4.

<sup>70</sup> Zetland Community Action Group, Submission No.28, p.D.

<sup>71</sup> Ibid, p.E.

<sup>72</sup> Allen P (1993) What is the responsible role for incineration in waste management?' *Incineration an option for waste management* Proceedings of a seminar on incineration of domestic waste, Pavillion Hotel, Canberra, 30 November 1993, p.92.

<sup>73</sup> Wall B (1992) *Report on Study Tour Examining Hazardous Waste Technologies*. October 1992, p.6.

incinerator may be an appropriate use could be the treatment of debris from oil spills.<sup>74</sup>

### *Domestic Waste Stream*

3.45 There are a number of enterprises in Australia which are looking at the possibility of constructing incinerators to process municipal waste in the future. The only domestic waste incinerator currently operating in Australia is the Waverley Woollahra Process Plant, other than those in the Australian Antarctic Territory.

### *Waverley Woollahra Process Plant*

3.46 The Waverley Woollahra Process Plant was commissioned in 1973 as a co-operative waste disposal facility which is fully self funding.<sup>75</sup> Over 3 million tonnes of municipal and quarantine wastes have been incinerated and the Process Plant is now operating at 150,000 tonnes per annum.<sup>76</sup> The residues from the incineration process are disposed of at St Peters landfill and represent 10 per cent by volume of the incoming waste stream.<sup>77</sup>

3.47 Some local residents considered that the incinerator causes problems in relation to the noise, vibration, odour, traffic and particulate fallout.<sup>78</sup>

3.48 The Committee was told that the gate charges at the Waverley Woollahra Process Plant were higher than for landfill and transfer stations but were cost effective in some cases because of the travel

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<sup>74</sup> Australian Maritime Safety Authority, Submission No.34, p.2.

<sup>75</sup> Healey Management Group Submission No.6, p.2.

<sup>76</sup> Waverley and Woollahra Councils, Submission No.61, p.2.

<sup>77</sup> Department of Environment, Sport and Territories, Submission No.69, p.23.

<sup>78</sup> Zetland Community Action Group, Submission No.28, p.C.

costs.<sup>79</sup> The Healey Management Group considered that the gate charges at alternative putrescible disposal options were politically rather than economically determined.<sup>80</sup> The true costs of waste disposal in Sydney are unknown but generally considered to be underpriced.<sup>81</sup>

3.49 The Waverley and Woollahra Councils are considering upgrading the existing facilities. The financial costs of incineration, even with very high environmental standards, are rarely higher than the costs of recycling.<sup>82</sup> Incinerators produce a single product of predictable quality for which a market already exists.<sup>83</sup> The cost of incineration must include the external costs of emissions and ash residues.<sup>84</sup>

### *Antarctica*

3.50 Australia has accepted the *Protocol on Environmental Protection to the Antarctic Treaty*, which incorporates a waste disposal and waste management annex. The *Antarctic (Environment Protection) Legislation Amendment Act 1992* places a number of obligations on Australia.

3.51 The obligations permit the incineration of certain items provided the residue is removed and precautions are taken to reduce the emissions.<sup>85</sup> Each of Australia's three stations at Casey, Davis and Mawson has an incinerator.<sup>86</sup>

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<sup>79</sup> Healey Management Group, Submission No.6, p.3.

<sup>80</sup> Ibid, p.3.

<sup>81</sup> Travers Morgan (1992) *Economics of Solid Waste Management Industry in Sydney*, cited in Healey Management Group, Submission No.6, p.3.

<sup>82</sup> Second Time Around, *The Economist* May 29th 1993, pp.12-19, p.19.

<sup>83</sup> Ibid, p.10.

<sup>84</sup> Zetland Community Action Group, Submission No.28, p.E.

<sup>85</sup> Department of Environment, Sport and Territories, Submission No.69, p.24.

<sup>86</sup> Ibid, p.25.



### *Waste to Energy*

3.52 Waste can provide a cheap and reliable source of energy. Incinerators are used in Denmark to dispose of household and industrial waste and to produce energy for heating and electricity.<sup>87</sup> The Committee was told that this is the favoured option because of the total reliance on ground water, the lack of landfill sites and the use of the energy for town heating in some areas of Europe.<sup>88</sup> About 10 per cent of houses in Sweden are heated through waste to energy.<sup>89</sup> The US National Energy Strategy (1991) called for a sevenfold increase in electricity generation from municipal waste by the year 2010.<sup>90</sup>

3.53 The Committee was told that the advantages of waste to energy include the recycling of the energy content, the reduction of 90 per cent in the volume going to landfill, a reduction in organic content, less CO<sub>2</sub>, CH<sub>4</sub> and dioxin.<sup>91</sup>

3.54 The Heidelberg City Council in Victoria is considering the option of constructing a waste to energy plant which could provide significant benefits to the council, the repatriation hospital and the community.<sup>92</sup>

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<sup>87</sup> Andreasson C (1992) Waste Incineration Techniques, Sino-Italian Conference on Cogeneration Modern Power Generation technologies. Taipei International Convention Centre, Taipei, 15-16 December 1992, p.1.

<sup>88</sup> Wall, B (1992) *Report on Study Tour Examining Hazardous Waste Technologies*. October 1992. p.4.

<sup>89</sup> Department of Environment, Sport and Territories, Submission No.69, p.27.

<sup>90</sup> Van Gemert P (1993) 'Waste to energy - part of a responsible waste management strategy' *Incineration an option for waste management* Proceedings from a seminar on the incineration of domestic waste, Commonwealth Environment Protection Agency, Pavillion Hotel, Canberra, 30 November 1993, p.21.

<sup>91</sup> Australian National Industries Ltd, Submission No.27, p. 39; Denlay J (1993) 'Waste minimisation - the sustainable option' *Incineration an option for waste management*. Proceedings of a seminar on incineration of domestic waste. Pavillion Hotel, Canberra, 30 November 1993, p.41 citing Dr heydemann, Minister of the Environment in Scheswig-Holstein, Germany.

<sup>92</sup> City of Heidelberg, Submission No.33, p.2.

The costs of transport and tipping have increased by 400 per cent in the past five years and are expected to escalate from \$35 to \$75-80 per tonne by the year 2000.<sup>93</sup>

3.55 The benefits of the waste to energy process include the reduction in the use of fossil fuels and in the problems with greenhouse gases as well as reduced pressure on landfill.<sup>94</sup> The use of waste to energy can reduce the transportation of wastes as well as extending the life of landfills.<sup>95</sup>

3.56 The benefits listed by the Council include a 90 per cent reduction in the amount going to landfill; lower long term costs; revenue from energy sales; disposal of clinical wastes; avoiding the cost of upgrading the existing coal-fired burners.<sup>96</sup>

3.57 The net environmental gains from lower emission levels from waste to energy plants compared with coal fired boilers in the hospital, avoids problems of methane gas and leachate from landfill; it would avoid production of carbon monoxide from transportation of waste to landfill and coal to the hospital and avoid greenhouse gas emissions from the mining of brown coal.<sup>97</sup> A study by Maunsells has found that there is a potential net reduction of 45 per cent in greenhouse gas emissions.<sup>98</sup>

3.58 The Committee is concerned that in projects similar to the Heidelberg model, there is a capacity to balance the figures so that there is a coincidence between what is needed and what is produced, which may act as a disincentive to recycle and reuse. In relation to recycled materials Mr van Gemert was of the opinion that:

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<sup>93</sup> Department of Environment, Sport and Territories, Submission No.69, p.25.

<sup>94</sup> Packaging Council of Australia Inc, Submission No.56, p.1.

<sup>95</sup> Chamber of Manufactures of New South Wales, Submission No.67, p.8.

<sup>96</sup> City of Heidelberg, Submission No.33, p.2.

<sup>97</sup> City of Heidelberg, Submission No.33, p.2; van Gemert, Evidence, p.615.

<sup>98</sup> van Gemert, Evidence, p.616-617.

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The difficulty is that it does not matter what technology is capable of doing; if there are no end markets to support the product that you create then there is no long term viability.<sup>99</sup>

3.59 The Committee is concerned that if there is a convenient manner of waste disposal this may act as a disincentive for waste minimisation. The Committee was told, however, that in the area serviced by the Waverley Woollahra incinerator, the tonnage throughput from those councils had fallen consistently over the previous five years as more material is recycled.<sup>100</sup>

3.60 The Australian National Industries model proposed that waste minimisation programs could achieve a 10 per cent reduction, that 25 per cent would be recycled and 25 per cent composted, leaving 40 per cent to go to incineration or landfill.<sup>101</sup> With the incorporation of a waste to energy system of this 40 per cent, 25 per cent is waste to energy, 6 per cent is flyash which could be used in cement, 6 per cent is bed ash which could be used as road base or bulk fill and 3 per cent would go to landfill.<sup>102</sup> These figures represent the European situation but ANI told the Committee that they are much the same for other urban centres.<sup>103</sup>

### *Fuel for Waste to Energy*

3.61 While the disposal of plastics to landfill does not present any environmental problems in relation to leachates, greenhouse or ozone depleting gases, they retain the original calorific value of the raw materials and can be used as alternative fuels.<sup>104</sup> It was suggested to

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<sup>99</sup> Ibid, p.617.

<sup>100</sup> Ferguson, Evidence, p.386.

<sup>101</sup> Gutteridge, Evidence, p.301.

<sup>102</sup> Ibid, p.301-302.

<sup>103</sup> Ibid, p.301.

<sup>104</sup> Plastics Industry Association Inc, Submission No.59, p.1.

the Committee that the only use of contaminated plastics may be incineration for energy recovery.<sup>105</sup>

3.62 The City of Heidelberg Council pointed out that dried municipal waste has a mean calorific value of 10-12 megajoules per kilogram, while Yallourn brown coal value is of the order of 22.4 megajoules per kilogram.<sup>106</sup> The repatriation hospital used 10 000 tonnes of brown coal per year to produce steam.<sup>107</sup>

**Table of Material Energy values (megajoules per kilogram)**

<b>Fuels</b>	<b>MJ/KG</b>
Natural Gas (methane)	37-49
Fuel Oils	42-47
Black Coal (dry basis)	28-37
Brown Coal (wet basis) La Trobe Valley	8-10
Wood	9-14
Municipal Waste	10-14
Plastics - Polyolefins	41-43
Plastics Polystyrenes	37-39
Plastics - Vinyl	16-20 <sup>108</sup>

3.63 Efficiencies of 20-50 per cent can be achieved in waste to energy plants which are used to generate heat and electricity compared to 33-38 per cent efficiency for coal fired power stations.<sup>109</sup> The Committee was told that if Australia converted all of its waste to energy, a further

<sup>105</sup> Healey Management Group, Submission No.6, p.5.

<sup>106</sup> van Gemert, Evidence, p.614.

<sup>107</sup> Ibid, p.615.

<sup>108</sup> Plastics Industry Association Inc, Submission No.59, p.4.

<sup>109</sup> Healey Management Group, Submission No.6, p.6.

4.5 million tonnes of coal per year could be exported, which would have an estimated value of \$160 million.<sup>110</sup>

3.64 Lohning Brothers Pty Ltd estimated that 2.5 kgs of waste would produce 1 kilowatt hour of electricity, and therefore the 4000 tonnes of waste produced in Sydney had a potential value of 1.6 million kilowatt hours per day.<sup>111</sup> The New South Wales rate is about 7 cents per kilowatt hour which makes projects more viable.<sup>112</sup> The Electricity Council of NSW has released a set of guidelines relating to the purchase of electricity generated privately.<sup>113</sup>

Table 1: The energy contents value of household garbage:<sup>114</sup>

Component	Energy (MJ/KG)
Paper	16.8
Food	4.7
Plastic	32.7
Polyethylene	38.9
Paperboard	13.7
Textile	17.5
Rubber	23.3
Leather	17.5
Wood	18.7

<sup>110</sup> Australian National Industries Ltd, Submission No.27, Presentation to the House of Representatives Standing Committee on the Environment Recreation and the Arts, p.4.

<sup>111</sup> Lohning Brothers Pty Ltd 1993 *Energy From Municipal Waste*, p.1.

<sup>112</sup> Lohning, Evidence, p.281.

<sup>113</sup> Electricity Council of NSW 1991 *Private Generation Buyback Guidelines*, 13 November 1991.

<sup>114</sup> Zahedi, Submission No.31, p.4; Robertson G (1993) *Incineration With Energy Recovery of MSW: The biofuel of the 21st century* Paper presented to Asian Industrial Technology Congress '93 Conference on Environmental and Related materials Technology, Hong Kong 21-22 May 1993, p.5.

3.65 The Committee was told that in Melbourne 100 MW of electricity could be generated from the incineration of waste, which is 1.73 per cent of the electricity produced by coal powered stations in the Latrobe Valley, and this would save up to three tonnes of coal per day.<sup>115</sup>

3.66 Municipal waste in Western Europe has an energy value of about 8.8 MJ per kilogram, and Singapore of 5.8 MJ per kilogram due to a higher proportion of organic matter.<sup>116</sup>

Table 2: Dr Zahedi calculated that in Australian cities (based on the assumption of 1kg/person/day) the total energy contents of household waste was:<sup>117</sup>

	Population (Million)	Energy (per kg in MJ)	Total Energy per day (GJ)
Melbourne	3.022	8.78	26533
Adelaide	1.023	8.31	8491
Sydney	3.538	11.97	42350
Perth	1.587	9.37	14918
Canberra	0.279	11.20	3125
			95417

3.67 The net energy balance from incinerators would need to consider the energy from combustion compared with the energy involved in transport and production of goods from recycled or virgin materials.<sup>118</sup> In some situations incineration and recycling are not always mutually

<sup>115</sup> Zahedi, Submission No.31, p.4.

<sup>116</sup> Robertson G (1993) *Incineration With Energy Recovery of MSW: The biofuel of the 21st century*. Paper presented to Asian Industrial Technology Congress '93, Conference on Environmental and Related Materials Technology, Hong Kong 21-22 May 1993, p.5.

<sup>117</sup> Zahedi, Submission No.31, p.6.

<sup>118</sup> Department of Environment, Sport and Territories, Submission No.69, p.31.

beneficial.<sup>119</sup> The comparative data for waste components and its energy content for the capital cities is given in Table 3.

### *Community Concerns*

3.68 Apart from the arguments relating to the fact that incinerators are 'end of pipe' solutions, there are also concerns in relation to emission standards.<sup>120</sup> It was suggested to the Committee that proponents of technology fail to mention the negative aspects which are of most concern to the community, while opponents tend to highlight only the negative aspects.<sup>121</sup>

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<sup>119</sup> Ibid, p.31.

<sup>120</sup> Collins, Submission No.30, p.6.

<sup>121</sup> Ibid, p.5.

**Table 3**

The following information was provided to the Committee by Dr Ahmad Zahedi. The table represents of each waste component and its energy content in every 1000kg of household waste (assumes 1kg/person/day)<sup>122</sup>:

<sup>122</sup> Zahedi, Submission No.31, p.5.



3.69 It is important to appreciate that the perception of risk has a significant influence on the acceptability of technological solutions.<sup>123</sup> Ms Kathryn Collins told the Committee:

Inherent in these perceptions is a fundamental difference in the way that professionals and lay people evaluate and judge risk. Experts and professionals tend to use quantitative methods to evaluate risk, while citizens use other, more intuitive judgements. It may be true that in some cases these judgements are based on incomplete information. However, they tend to reflect legitimate concerns which are often omitted from expert risk analyses.<sup>124</sup>

3.70 Dalite Holdings consider that:

Public acceptance of incineration is exceedingly dependent upon governmental participation in the development of standards regarding the environment and facility permitting. It has been repeatedly demonstrated that public participation in the decision making process is decisive for the popular acceptance or rejection of incineration.<sup>125</sup>

3.71 The Committee was told that in Australia incineration is not well understood and that:

nothing is being done to give information to the public so that prejudices should be overcome, or the public may get accurate information on which to make a balanced judgement about incineration as a waste disposal option.<sup>126</sup>

3.72 The issues that must be considered during public consultation include: why incinerate instead of landfill; community benefits; why is it sited there instead of elsewhere; transport inconvenience and

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<sup>123</sup> Collins, Submission No.30, p.6.

<sup>124</sup> Collins, Evidence, p.366.

<sup>125</sup> Dalite Holdings Pty Inc, 'The Use of Incineration as a Means of Disposal of Waste and Energy Recovery'. Submission prepared by Hetzler F and Koenig R, Submission No.15, p.2.

<sup>126</sup> Healey Management Group, Submission No.6, p.7.

dangers; effect on taxes; health risks; dirt; odours; disposal of ash; and impact on recycling.<sup>127</sup>

3.73 The Department of Environment, Sport and Territories listed the following community concerns:

- possible incompatibility with waste minimisation objectives, particularly reuse and recycling;
- potential environmental impacts and health risks;
- justification for selection of technology;
- choice of sites;
- capital costs and the ramifications;
- fairness of the decision making process; and
- equity of the outcome in terms of the relative benefits for the community and the immediate neighbours of the plant.<sup>128</sup>

3.74 The Department considered that public concern was also caused by uncertainties about the level of emissions, the lack of consensus in the scientific community and the uninformed media commentaries.<sup>129</sup> It is difficult to determine the effect of an incinerator because of the mobility of the population and the cumulative effects of other industries in the area.<sup>130</sup>

3.75 The Waverley and Woollahra Councils have a policy where all the sampling results for emissions are publicly available and the community

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<sup>127</sup> Dalite Holdings Pty Inc, 'The Use of Incineration as a Means of Disposal of Waste and Energy Recovery' Submission prepared by Hetzler F and Koenig R, Submission No.15, p.2.

<sup>128</sup> Department of Environment, Sport and Territories, Submission No.69, p.29.

<sup>129</sup> Ibid, p.35.

<sup>130</sup> Ibid, p.37.

can view the operations at any time.<sup>131</sup> Dr Ewald, who is a member of the community liaison committee, told this Committee that the local people are prepared to have an incinerator provided they know what is coming out of it and provided they can be convinced that it is being done as well as it is said to be done.<sup>132</sup>

3.76 The Woollahra Council told the Committee that from the two surveys conducted showed that the opposition to incineration had been much overstated.<sup>133</sup> The community liaison committee comprised elected members and staff of the user councils, members of the EPA, members from plant management, members of the community and any interested environmental groups.<sup>134</sup>

3.77 There were also a number of community concerns in relation to the potentially hazardous materials in municipal waste. The Committee was told that mercury from the incineration of municipal solid waste was a major new source of mercury emissions in New Jersey.<sup>135</sup> Batteries which contain mercury and cadmium must be removed prior to incineration.<sup>136</sup>

3.78 The Committee was told that:

Although batteries represent less than one per cent of the total waste stream, their removal would reduce the predicted cancer risk from

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<sup>131</sup> Waverley and Woollahra Councils, Submission No.61, p.3.

<sup>132</sup> Ewald, Evidence, p.446-447.

<sup>133</sup> Lemech, Evidence, p.385.

<sup>134</sup> Ibid, p.385.

<sup>135</sup> du Plessis L (1993) 'Keeping toxics out of waste and securing the ash and residues'. *Incineration an option for waste management* Proceedings from a seminar on incineration of domestic waste. Commonwealth Environment Protection Agency, Pavillion Hotel, Canberra, 30 November 1993, p.54 which cited Amos, C (1991) Getting ready for the mercury challenge at municipal waste incinerators' *Solid Waste and Power* (April 1991): 24-32.

<sup>136</sup> Toxic Chemicals Committee, Total Environment Centre Inc, Submission No.36, p.7.

incinerator air emissions by as much as 25 per cent, far more than any other constituent of the waste stream.<sup>137</sup>

3.79 Further, it was pointed out that the management of municipal waste incinerators had little control over the material coming in.<sup>138</sup> Social and technological changes over the past 20 years have significantly altered the composition of the waste stream, such as the significant increase in plastics, paper and packaging.<sup>139</sup>

3.80 The technology is, however, available which can separate paper and plastics from the waste stream.<sup>140</sup> The Waverley and Woollahra Councils have implemented bans on concentrated quantities of plastics, medical, pharmaceutical and industrial wastes.<sup>141</sup>

3.81 A risk assessment on the sludge incinerators in Sydney gave similar results to that type of facility in the USA. ACT Electricity and Water consider a typical risk level for a well operated incinerator to be 1 in 1000, which is analogous to smoking 2 cigarettes, drinking one bottle of wine, bicycling 20 km, travelling 400 km by car or driving an agricultural tractor for 2 days.<sup>142</sup>

3.82 Accordingly, it was suggested to the Committee that if incinerators were used then items which increased the potential risk

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<sup>137</sup> du Plessis L (1993) 'Keeping toxics out of waste and securing the ash and residues'. *Incineration an option for waste management* Proceedings from a seminar on incineration of domestic waste. Commonwealth Environment Protection Agency, Pavillion Hotel, Canberra, 30 November 1993, p.55 which cited Wartenberg D (1993) 'Do dead batteries cause cancer' *Air and Waste* 43: 880-881.

<sup>138</sup> du Plessis L (1993) 'Keeping toxics out of waste and securing the ash and residues'. *Incineration an option for waste management* Proceedings from a seminar on incineration of domestic waste. Commonwealth Environment Protection Agency, Pavillion Hotel, Canberra, 30 November 1993, p.54.

<sup>139</sup> Environmental Management Industry Association of Australia Limited, Submission No.63, p.7.

<sup>140</sup> Gutteridge, Evidence, p.312.

<sup>141</sup> Waverley and Woollahra Councils, Submission No.61, p.3.

<sup>142</sup> ACT Electricity and Water, Submission No.76, p.6.

should be separated from the general waste stream.<sup>143</sup> The Committee supports this approach and considers that adequate sorting facilities should be a prerequisite for the approval of incinerator construction.

### *Ash Residue*

3.83 The resulting ash may be sterile but toxic due to contamination by non-combustible components such as heavy metals.<sup>144</sup> Some of the ash can be used in the incinerator to increase burning efficiency and some can be used in cement manufacture and roadbase material.<sup>145</sup>

3.84 Greenpeace Australia told the Committee that in the United States, the standard EP toxicity test failure rate for incinerator ash is: flyash 100 per cent; bottom-ash 38 per cent; and a combination of fly-ash and bottom ash 47 per cent.<sup>146</sup> Toxic ash must be sent to a secure landfill.

3.85 It is essential that there be suitable testing and disposal of the bottom ash which may be toxic or hazardous. The Committee was told that the TCLP (toxic characteristics leaching procedure) test which uses dilute acid or acetate buffer, does not simulate the wide range of complex aqueous solutions that may occur in landfills.<sup>147</sup>

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<sup>143</sup> du Plessis L (1993) 'Keeping toxics out of waste and securing the ash and residues'. *Incineration an option for waste management* Proceedings from a seminar on incineration of domestic waste. Commonwealth Environment Protection Agency, Pavillion Hotel, Canberra, 30 November 1993, p.54.

<sup>144</sup> Department of Environment, Sport and Territories, Submission No.69, p.8.

<sup>145</sup> Zahedi, Submission No.31, p.8.

<sup>146</sup> Cartmel, Evidence, p.402.

<sup>147</sup> du Plessis L (1993) 'Keeping toxics out of waste and securing the ash and residues'. *Incineration an option for waste management* Proceedings from a seminar on incineration of domestic waste. Commonwealth Environment Protection Agency, Pavillion Hotel, Canberra, 30 November 1993, p.56.

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3.86 The Committee was told that:

a typical method to dispose of toxic ash is to construct an engineered shallow land burial site. This requires a sealed basin with water drains to direct water seepage from rain and other sources to a collection system whereby the metals can be returned to the basin. After the basin is filled, it is capped with asphalt or concrete to prevent the accidental intrusion of water.<sup>148</sup>

The Committee is mindful that not many of Australia's landfill sites meet these standards.

*Economics of Incineration*

3.87 The Committee was told that incinerators need a certain amount of material and cannot be significantly overstoked or understoked to function correctly. Incinerators are now designed for varying loads within certain constraints.<sup>149</sup>

3.88 Incinerators may, however, require a guaranteed throughput of waste to maintain their short term economic viability.<sup>150</sup> There is also the question of the required revenue to meet the interest on the loans needed to build the facility and the running costs.<sup>151</sup> In the United States some contracts involve a penalty if the municipality does not burn a certain amount of waste and this is a disincentive to reduce waste.<sup>152</sup>

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<sup>148</sup> Dalite Holdings Pty Inc, 'Hazardous Waste Treatment Technology'. Submission prepared by Hetzler F and Koenig R, Submission No.15, p.2.

<sup>149</sup> Gutteridge, Evidence, p.303.

<sup>150</sup> Friends of the Earth, Submission No.48, p.3.

<sup>151</sup> du Plessis, L (1993) *Incineration of Municipal Waste*, Paper presented to the NCC Waste Crisis Network Seminar in Sydney on 25 September 1993,p.1-2.

<sup>152</sup> Denlay, Evidence, p.500.

3.89 In order to control the input rate and composition of the waste feed for incinerators, Mr Bateman told the November 1993 seminar on incineration that some potentially combustible wastes needed to be diverted to landfill at certain times.<sup>153</sup> Mr Denlay gave the example of Warren County which banned the recycling of newspaper because it needed fuel for the incinerator<sup>154</sup> and there have been cases of incinerators being stoked with woodchips to keep them burning.<sup>155</sup> In order to provide a constant feed for the minimum supply requirement there may be increased traffic from more distant municipalities or regions.

3.90 Mr van Gemert pointed out to the Committee that the same argument of throughput can also be used for the amount to landfill because the economics of landfill are also dependent on throughput.<sup>156</sup>

3.91 The economic consideration of incinerators must include the costs of ash management and the potential cost of remediation of polluted aquifers.<sup>157</sup> Currently, the options other than incinerators do not reflect the full costs of waste disposal.<sup>158</sup>

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<sup>153</sup> Bateman S (1993) 'The landfill option - does it have a future?' *Incineration an option for waste management*. Proceedings from a seminar on incineration of domestic waste. Commonwealth Environment Protection Agency, Pavillion Hotel, Canberra, 30 November 1993, p.37.

<sup>154</sup> Denlay J (1993) 'Waste minimisation - the sustainable option' *Incineration an option for waste management*. Proceedings of a seminar on incineration of domestic waste. Commonwealth Environment Protection Agency, Pavillion Hotel, Canberra, 30 November 1993, p.43.

<sup>155</sup> Denlay, Evidence, p.501.

<sup>156</sup> van Gemert, Evidence, p.622.

<sup>157</sup> du Plessis L (1993) 'Keeping toxics out of waste and securing the ash and residues' *Incineration an option for waste management*. Proceedings of a seminar on incineration of domestic waste. Commonwealth Environment Protection Agency, Pavillion Hotel, Canberra, 30 November 1993, p.56; Denlay J (1993) 'Waste minimisation - the sustainable option' *Incineration an option for waste management*. Proceedings of a seminar on incineration of domestic waste. Commonwealth Environment Protection Agency, Pavillion Hotel, Canberra, 30 November 1993, p.43.

<sup>158</sup> Department of Environment, Sport and Territories, Submission No.69, p.37.

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*Disincentives for Recycling*

3.92 It was argued that waste to energy with adequate on-site facilities would enhance the recovery of recyclables.<sup>159</sup> There was the concern that the construction of incinerators would not provide incentives to reduce packaging.<sup>160</sup> Although recycling is beneficial to incineration as glass, metal and some textiles lower the fuel value and increase the residue,<sup>161</sup> there was a general perception among environmental organisations that the construction of an incinerator would reduce the incentive to recycle. For example, the Zetland Community Action Group expressed the view that energy recovery from plastics was a big selling point for incinerator proponents.<sup>162</sup>

3.93 The Woollahra Council told the Committee that all of the research they had conducted had shown that incineration was compatible with waste minimisation.<sup>163</sup> They also pointed out that countries such as Germany, which were leaders in minimisation also used incineration extensively.<sup>164</sup>

3.94 In order to ensure that incinerators are designed and operated correctly, the waste feed must be the correct composition and must be fired at the correct temperature.<sup>165</sup> The waste needs to contain a

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<sup>159</sup> Association of Liquidpaperboard Carton Manufacturers Inc, Submission No.60, p.43.

<sup>160</sup> Zetland Community Action Group, Submission No.28, p.E.

<sup>161</sup> Healey Management Group, Submission No.6, p.7 citing The Institute of Waste Management (1993) *Integrating Materials and Energy Recycling*, September 1993, pp.30.

<sup>162</sup> Zetland Community Action Group, Submission No.28, p.E.

<sup>163</sup> Lemech, Evidence, p.385.

<sup>164</sup> Ibid, p.385.

<sup>165</sup> Environmental Management Industry Association Australia Limited, Submission No.63, p.11.



certain level of calorific value to sustain the furnace and much of the high calorific waste is paper and plastics which are recyclable.<sup>166</sup>

3.95 The Logan City Council supported the use of incineration of green waste, provided adequate measures are taken to ensure appropriate emission standards.<sup>167</sup> It was also suggested that incineration may be more energy efficient than separating and transporting organic wastes, particularly when considering the low economic value of the end product.<sup>168</sup>

3.96 A dissenting view expressed in the report of the NSW Joint Select Committee Upon Waste Management was that convenient options such as incineration would negatively impact on attempts to promote waste minimisation and recycling.<sup>169</sup> The Committee was told, however, that in the United States communities which used incinerators had an overall recycling rate of 23 per cent, while in Sydney recycling rates for households were 7 per cent, and when commercial waste is considered this figure was only 2.5 per cent.<sup>170</sup>

3.97 While incineration reduces the amount of material going to land fill, it also destroys a resource that could have been retrieved at a later stage. Recycling options may be developed after disposal of material. Landfill is better than incineration from the point of view that some materials can be retrieved if a future use is found.

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<sup>166</sup> Cartmel, Evidence, p.403.

<sup>167</sup> Logan City Council, Submission No.66, p.1.

<sup>168</sup> Healey Management Group, Submission No.6, p.6.

<sup>169</sup> Joint Select Committee Upon Waste Management (1993) p.69 cited in Collins, Submission No.30, p.6.

<sup>170</sup> Ewald, Evidence, p.442.

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### **Hospital Waste**

3.98 The ACT is the only State or Territory in Australia which has specific clinical waste legislation.<sup>171</sup> The incineration of hospital waste in the ACT is required to have an operational temperature of 1100°C with a minimum residence time of one second in the secondary chamber.<sup>172</sup> The Victorian EPA consider that a minimum temperature of 1100°C is necessary to minimise the formation of dioxins.<sup>173</sup> The widespread use of PVC in the medical field makes this aspect a focus of concern.<sup>174</sup>

3.99 Other problems relating to the incineration of hospital waste include the potential emission of bacteria and other microorganisms and pathogenic material during the start up before effective temperatures are reached.<sup>175</sup>

3.100 EMIAA considered that the lack of uniform state taxes, laws and levels of inspection of waste disposal provided incentives to transport wastes from their point of origin to other jurisdictions with lower standards.<sup>176</sup> One such example was provided by the Doolandella, Pallara and District Residents Association.<sup>177</sup>

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<sup>171</sup> Wade, Evidence, p.213.

<sup>172</sup> ACT Government, Submission No.77, p.1

<sup>173</sup> Robinson, Evidence, p.658.

<sup>174</sup> Allen P (1993) 'What is the responsible role for incineration in waste management?' *Incineration an option for waste management*. Proceedings from a seminar on incineration of domestic waste, Commonwealth Environment Protection Agency, Pavillion Hotel, Canberra, 30 November 1993, p.93.

<sup>175</sup> Matrix Technology Pty Ltd (1993) *Integrated Safe Disposal System For Waste Materials*, June 1993, p.4.

<sup>176</sup> Environmental Management Industry Association of Australia Limited, Submission No.63, p.15.

<sup>177</sup> Doolandella, Pallara and District Residents Association Inc, Submission No.73, p.2.

3.101 Notwithstanding a history of substandard operation which enabled a Brisbane company to undercut competitors in obtaining contract<sup>178</sup>, a new incinerator was commissioned in Queensland on 15 December 1993 but broke down ten days later.<sup>179</sup> While the incinerator was not functioning, ambient temperatures were around 40°C and the Committee was told that:

medical waste was stockpiled in 'industrial skips' under polytarps and stored in the open at the rear of the building ..... there are no back-up incineration facilities in Queensland and the company intends to use a sub-contractor in Melbourne to burn medical waste.<sup>180</sup>

3.102 The Committee is of the view that commonsense must prevail in relation to the interstate transport of medical wastes. On 7 March 1994 medical waste from Brisbane was sent to Sydney for disposal.<sup>181</sup> The practice of obtaining contracts by undercutting competitors by using unacceptable practices should be addressed as a matter of urgency.

3.103 Doolandella, Pallara and District Residents Association also expressed concern about the risks for communities on the transport corridors, particularly in cases where operators were reluctant to clearly label containers as required by the Transport of Dangerous Goods Code.<sup>182</sup>

3.104 The ANZECC policy on hospital wastes is that it should be treated in their state of origin to the extent practicable but where adequate facilities are not available, it may be transported to another state with facilities which meet appropriate standards.<sup>183</sup>

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<sup>178</sup> Ellis, Evidence, p.575.

<sup>179</sup> Doolandella, Pallara and Districts Residents Association, Submission No.73, p.2.

<sup>180</sup> Ibid, p.2.

<sup>181</sup> Ibid, p.2.

<sup>182</sup> Ibid, p.2.

<sup>183</sup> Robinson, Evidence, p.659.

3.105 Dr Robinson pointed out to the Committee that the States are not in a position to enforce this because of the free trade requirements of the constitution and this can only be enforced by Commonwealth legislation.<sup>184</sup> Accordingly the Committee recommends that:

**Recommendation 1**

**The Committee recommends that the Government investigate the need for legislation relating to the transport of hospital wastes across borders and implement an appropriate strategy to reduce the risks associated with the transport and treatment of hospital wastes.**

***Concluding Comments***

3.106 It is essential that if councils/States decided to take the incineration option, this should not reduce the responsibility of industry to strive for the avoidance, minimisation and recycling options.<sup>185</sup> The Committee considers that if incinerators are to be installed that it should include a comprehensive recycling facility and a waste to energy component as part of that authority's waste management strategy.

3.107 The Committee does not support the principle of incineration for the processing of domestic waste, but if State, Territory and local governments make the choice to construct an incinerator then, the Committee recommends that:

**Recommendation 2**

**The Committee recommends that approvals for the construction of incinerators should include recycling and waste to energy facilities.**

<sup>184</sup> Ibid, p.659.

<sup>185</sup> Packaging Council of Australia Inc, Submission No.56, p.2.

3.108 The Committee is also of the view that in the time frame of the construction of a municipal incinerator a great deal can be achieved with effective waste minimisation programs and this should be given government priority. It is a matter of concern to the Committee that estimates of the amount of waste available for incineration or other waste management programs are based on inadequate, out of date and unreliable figures.

3.109 Internationally there are a number of examples of problems where changes in the waste stream have made the operation of incinerators difficult or impossible. The Committee urges that the authorities responsible for the approval of major waste management proposals such as these ensure that adequate up to date information is available before decisions are made.

3.110 Further, there are no nationally agreed standards or guidelines for the operation of incinerators.<sup>186</sup> The Australian Environment Council and the National Health and Medical Research Council published guidelines for emissions from stationary sources in 1986.<sup>187</sup> The NSW EPA favours the adoption of German standards for emissions and the disposal of residues from incinerators.<sup>188</sup> This matter also needs to be addressed as a matter of urgency.

3.111 There is a world trend toward stricter emission standards paralleling technological developments, rather than any proven risk assessment of public health.<sup>189</sup> The Committee was told that the community's prime concern in relation to incineration was in relation to the emissions. The EMIAA stated that:

the community has come to regard emissions as the most unacceptable form of pollution, due to concern regarding global warming and ozone depletion. Unfortunately, that concern does not extend to the family car (many of which are over 8 years old), the pot belly stove in winter, or our heavy reliance on urban infrastructure, such as the generation

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<sup>186</sup> Department of Environment, Sport and Territories, Submission No.69, p.27.

<sup>187</sup> Ibid, p.27.

<sup>188</sup> Ibid, p.27.

<sup>189</sup> Ibid, p.27.

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of electricity, manufacture of metallic products, and road transport of goods.<sup>190</sup>

3.112 The ACF's view of the Australian Conservation Foundation was that incineration should be considered on merit with other options because:

There are 10 million mobile incinerators burning toxic chemicals in Australia which we call cars which are probably the most serious incineration problem in the country.<sup>191</sup>

3.113 EIMAA considered that the acceptance of incinerators by the Australian community was a problem of communication rather than one of technology.<sup>192</sup>

3.114 Apart from the community concern, historically another reason for the delay in the introduction of waste to energy plants was the inability to sell energy into grids. This problem has only been overcome in recent reforms.<sup>193</sup> There has also been increased pressure on councils to find options other than landfill. A number of inner city councils are looking at incineration options.<sup>194</sup>

3.115 The Committee is satisfied that the available technology can meet very stringent environmental standards when operated correctly. The fact remains, however, that even if the very best incinerator were to be installed which reduced pollution levels to an absolute minimum, this process destroys the materials and they then have to be or will be

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<sup>190</sup> Environmental Management Industry Association of Australia Limited, Submission No.63, p.11.

<sup>191</sup> Brotherton, Evidence, p.698.

<sup>192</sup> Environmental Management Industry Association of Australia Limited, Submission No.63, p.16.

<sup>193</sup> Hyman, Evidence, p.87.

<sup>194</sup> Ibid, p.87.

replaced. For how long can the planet support a process such as this. Incineration does not attack the root cause of the problem.<sup>195</sup>

3.116 Dr Paul Connett said that:

A modern state-of-the-art garbage incinerator is a sophisticated answer to the wrong question. The task ahead is not to find a new place to put garbage, the real task is to find ways to unmake garbage. Instead of spending millions of dollars trying to perfect the destruction of our discarded materials, we should be putting all our efforts into recovering them.<sup>196</sup>

3.117 In the USA there is now a surplus of incinerators due to the 'overly optimistic waste quantity predictions in the 1980s'.<sup>197</sup> In Australia there appears to be a great deal of confusion about the quantities of various wastes that are available to the commercial market. Inadequate information is available on basic data, such as the volume of material going to landfill. This will have a significant impact on economic estimates and predictions of the time landfill will last.

3.118 The Committee appreciates that there will be increased pressure to use incineration as the amount of landfill space available diminishes. The Committee believes that incineration should not be banned as councils and governments should have a full range of options to choose from when developing waste management plans. However, it is very important that decision makers properly survey the amounts of waste available, and the economic, social and environmental impacts of these facilities where previously installed.

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<sup>195</sup> Cartmel, Evidence, p.405.

<sup>196</sup> Ibid, Evidence, p.404.

<sup>197</sup> Dalite Holdings Pty Inc, 'The Use of Incineration as a Means of Disposal of Waste and Energy Recovery'. Submission prepared by Hetzler F and Koenig R, Submission No.15, p.4.

