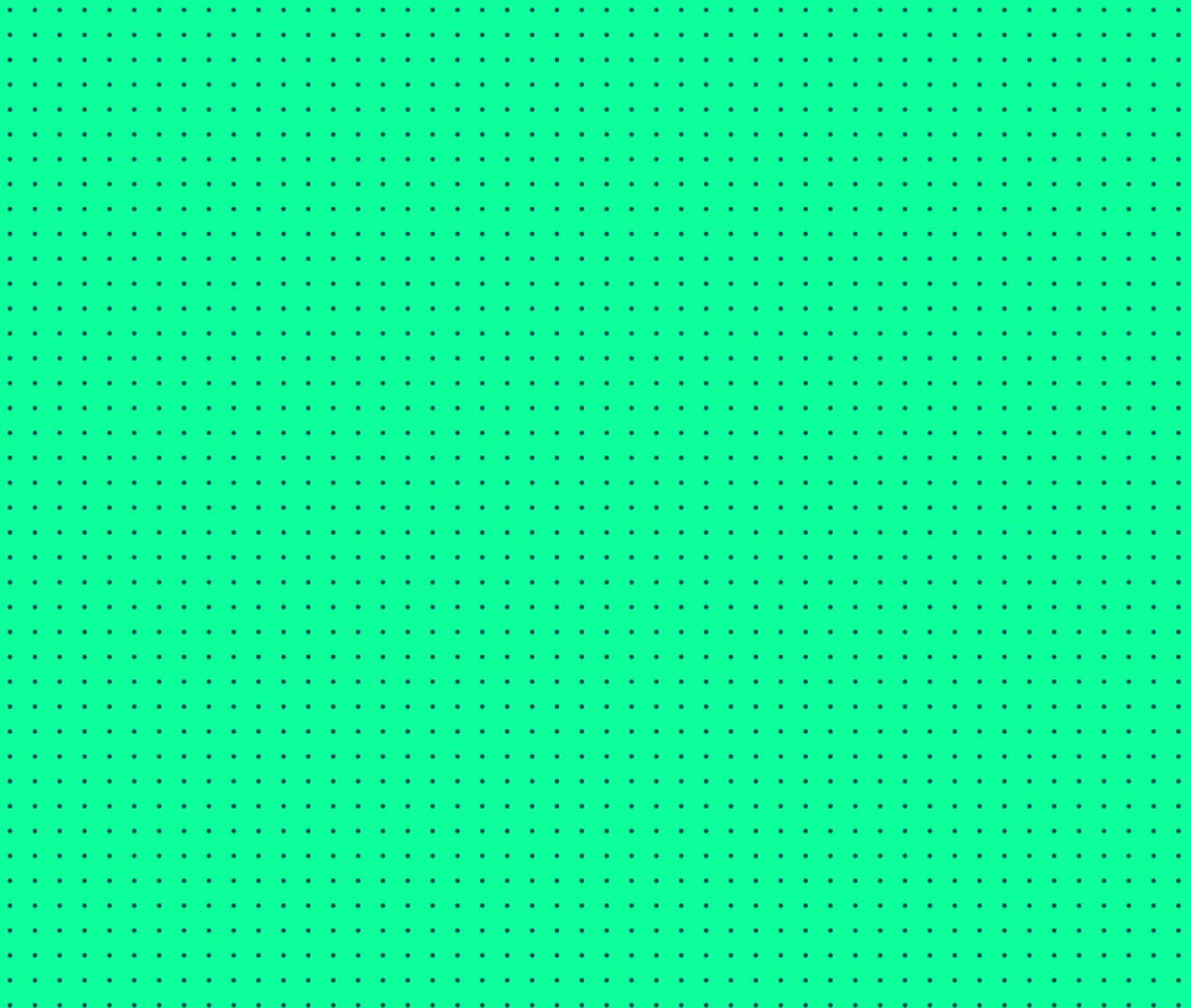




Environment Protection Authority

# NSW Energy from Waste

Draft policy statement for public consultation



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Published by:

**NSW Environment Protection Authority**

4 Parramatta Square

12 Darcy Street, Parramatta NSW 2150

Locked Bag 5022, Parramatta NSW 2124

Phone: +61 2 9995 5000 (switchboard)

Phone: 131 555 (NSW only – environment information and publications requests)

Fax: +61 2 9995 5999

TTY users: phone 133 677, then ask  
for 131 555

Speak and listen users:

phone 1300 555 727, then ask for 131 555

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# Definitions

Eligible waste fuels	Waste or waste-derived materials considered by the EPA to pose a low risk of harm to the environment and human health due to their origin, low levels of contaminants and consistency over time.
Energy recovery facility	A facility that thermally treats waste or waste-derived materials that do not meet the definition of an eligible waste fuel. These facilities must be able to demonstrate that they will be using current international best practice techniques.
Processing facility	Facility undertaking genuine resource recovery operations, producing separate output material streams for reuse or recovery. Facility may be separate to, or on the same site as, an energy from waste facility.
Resource recovery order and exemption	Resource recovery orders and exemptions are issued by the EPA under Part 9 of the Protection of the Environment Operations (Waste) Regulation 2014 and exempt a person from the various waste regulatory requirements that apply to the use of a waste fuel (e.g. waste disposal licensing, levy payments, etc.). The exemptions apply to waste fuels determined by the EPA to be fit-for-purpose, genuine energy recovery opportunities.
Thermal treatment	According to Schedule 1 of the <i>Protection of the Environment Operations Act 1997</i> , thermal treatment means the processing of waste by burning, incineration, thermal oxidation, gasification, pyrolysis, plasma or other thermal treatment processes.
Waste	As defined in the dictionary of the <i>Protection of the Environment Operations Act 1997</i>

# 1. Introduction

The Environment Protection Authority (EPA) recognises that the recovery of energy and resources from the thermal processing of waste has the potential, as part of an integrated waste management strategy, to deliver positive outcomes for the community and the environment. Energy from waste can be a valid pathway for residual waste where:

- further material recovery through reuse, reprocessing or recycling is not financially sustainable or technically achievable
- community acceptance to operate such a process has been obtained.

In NSW, two key policy objectives are enshrined in the state's waste legislation. Firstly, the [Protection of the Environment Operations Act 1997](#) (POEO Act) sets the framework to ensure that human health and the environment are protected from the inappropriate use of waste. Secondly, the [Waste Avoidance and Resource Recovery Act 2001](#) (WaRR Act) aims to ensure that consideration of resource management options occurs in the following order:

1. avoidance of unnecessary resource consumption
2. resource recovery (including reuse, reprocessing, recycling and energy recovery)
3. disposal.

Where waste cannot be avoided or products reused, various recovery technologies are available to maximise resource efficiencies and increase the sustainability of our communities, businesses and industries.

The EPA has applied the following overarching principles to waste avoidance and recovery:

- higher value resource recovery outcomes are maximised
- air quality and human health are protected
- 'mass burn' disposal outcomes are avoided
- scope is provided for industry innovation.

The thermal treatment of waste provides an opportunity to recover the embodied energy from waste, offset the use of non-renewable energy sources, and avoid methane emissions from landfill.

However, these outcomes depend on ensuring that any energy recovery proposals represent the most efficient use of the resource and the risks of harm to human health or the environment are adequately managed. Clean air is fundamental to everyone's wellbeing: poor air quality can be particularly critical to the health of children and chronically ill and older people, as well as affecting the natural environment and amenity of communities.

To ensure emissions are adequately mitigated, facilities proposing to recover energy from waste will need to meet current international best practice techniques, particularly regarding:

- process design and control
- emission control equipment design and control
- emission monitoring with real-time feedback to the controls of the process.

The NSW Energy from Waste Policy statement sets out the policy framework and overarching criteria that apply to facilities in NSW proposing to thermally treat waste or waste-derived materials for the recovery of energy. In doing so, it provides regulatory clarity to industry and the community.

## 2. Energy recovery framework and scope

The NSW Energy from Waste Policy statement outlines the policy framework and technical criteria that apply to facilities proposing to recover energy from waste in NSW.

### Scope of the policy statement

The scope of the policy statement covers all facilities undertaking the thermal treatment of any waste<sup>1</sup> or waste-derived materials, where thermal treatment means the processing of wastes by combustion, thermal oxidation, thermal or plasma gasification, pyrolysis and torrefaction. Where a thermal process, such as pyrolysis or gasification, produces a gas for subsequent combustion (for example, a syngas), the facility where that gas is combusted will also be subject to this framework.

However, there are some thermal treatment applications that fall outside the scope of this policy statement. The following facilities are excluded as they are not considered to be undertaking genuine energy recovery:

- incineration facilities for the destruction of waste
- facilities for the thermal treatment of contaminated soil
- facilities proposing the thermal treatment of unprocessed mixed waste streams
- facilities proposing the thermal treatment of waste that has been exhumed from landfills
- facilities proposing the thermal treatment of hazardous waste materials.

Other facilities excluded from this policy statement include those that are undertaking a form of thermal treatment to which the technical or resource recovery criteria in the statement are not relevant or for which other regulatory frameworks already apply, namely:

- thermal processes where there is no change in the chemical composition of the waste
- transport fuels produced from waste
- autoclaving processes
- biological processes, such as anaerobic digestion and composting of waste.

### Policy framework

The definition of waste covers a range of materials that vary in their origin, composition, contamination and risk profile. The EPA recognises that a framework that facilitates a risk-based approach to the recovery of energy from waste will deliver certainty for industry, the community and the environment.

This policy statement establishes a two-tiered framework, separating the requirements for low-risk wastes proposed for thermal treatment from all other wastes.

Waste or waste-derived materials that pose a minimal risk of harm to human health and the environment due to their origin, low levels of contaminants and consistency over time will be categorised as **eligible waste fuels** and listed in the policy statement. As information about certain waste and waste-derived streams improves, the EPA will review the eligible waste fuels list from

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<sup>1</sup> As defined in the *Protection of the Environment Operations Act 1997*

time to time. Further information regarding the requirements to be met by eligible waste fuels is available in Section 3 of this policy statement.

Facilities proposing to thermally treat any waste or waste-derived materials that are **not** listed as an eligible waste fuel must meet the requirements of an energy recovery facility. Further information regarding the requirements for energy recovery facilities is available in Section 4 of this policy statement.

## **Public consultation and the good neighbour principle**

Regardless of whether a facility plans to go ahead with a proposal under Section 3 or 4 of this policy statement, it will be essential that proponents provide effective information and public consultation about energy from waste proposals. As proposals progress from the concept to detailed development assessment stage, proponents should engage in a genuine dialogue with the community and ensure that planning consent and other approval authorities are provided with accurate and reliable information.

The operators of an energy from waste facility will need to be 'good neighbours' – particularly if near a residential setting but also where there are workers in other facilities. This would apply to waste deliveries and operating hours, but most importantly with respect to readily available information about emissions and resource recovery outcomes.

### 3. Eligible waste fuels

Eligible waste fuels are those that are considered by the EPA to pose a low risk of harm to human health and the environment due to their origin, composition and consistency.

The following wastes are categorised by the EPA as eligible waste fuels:

1. biomass from agriculture
2. forestry and sawmilling residues
3. uncontaminated wood waste
4. recovered waste oil
5. organic residues from virgin paper pulp activities
6. landfill gas and biogas
7. source-separated green waste (used only in processes to produce char)
8. tyres (used only in approved cement kilns).

The EPA may update the list of eligible waste fuels from time to time.

Eligible waste fuels may be thermally treated using a range of treatment technologies, provided a resource recovery order and exemption has been granted by the EPA. The origin, composition and consistency of these wastes must ensure that emissions from thermal treatment will be known and consistent over time.

Facilities proposing to use eligible waste fuels must meet the following criteria:

- ability to demonstrate to the EPA that the proposed waste consistently meets the definition of an EPA-approved eligible waste fuel
- confirm there are no practical, higher order reuse opportunities for the waste
- fully characterise the waste and/or undertake proof of performance
- meet the relevant emission standards as set out in the [Protection of the Environment Operations \(Clean Air\) Regulation 2010](#).

**Note:** Eligible waste fuels that also fall under the definition of a standard fuel as defined in the Protection of the Environment Operations (Clean Air) Regulation 2010 would not need to meet the above criteria but will still require appropriate approval for their use.

Further details are provided in the *EPA's Eligible Waste Fuels Guidelines*. These include how to apply for a resource recovery order and exemption for the use of an eligible waste fuel and definitions for each of the listed eligible waste fuels.

## 4. Energy recovery facilities

Any facility proposing to thermally treat a waste or waste-derived material that is not a listed eligible waste fuel (Section 3) must meet the requirements to be an energy recovery facility. If the facility is proposing to thermally treat a combination of eligible and other waste fuels, it will be subject to the requirements of an energy recovery facility.

Energy recovery facilities refer to facilities that thermally treat waste-derived materials that fall outside the low-risk 'eligible waste fuels' definition. These facilities must therefore show they will be using current international best practice techniques, particularly regarding:

- process design and control
- emission control equipment design and control
- emission monitoring with real-time feedback to the controls of the process
- arrangements for the receipt of waste
- management of residues from the energy recovery process.

These considerations ensure that air pollution is appropriately mitigated.

Energy recovery facilities must use technologies that are proven, well understood and capable of handling the expected variability and type of waste feedstock. This must be demonstrated through reference to fully operational plants using the same technologies and treating like waste streams in other similar jurisdictions.

As well as using current best practice techniques, energy recovery facilities must ensure that they meet the following technical, thermal efficiency and resource recovery criteria.

### Technical criteria

An energy recovery facility processing wastes other than 'eligible waste fuels' must satisfy all the technical requirements below, regardless of whether the facility is existing or purpose-built and the waste input is the sole feedstock or a fuel for co-firing.

### Plant design and operation

The gas resulting from the process should be raised, after the last injection of combustion air, in a controlled and homogenous fashion and even under the most unfavourable conditions to a minimum temperature of 850°C for at least two seconds (as measured near the inner wall or at another representative point of the combustion chamber). If the waste fuel fed to the primary (first) combustion chamber has a content of more than 1% of halogenated organic substances, expressed as chlorine, the temperature should be raised to 1,100°C for at least two seconds after the last injection of air.

The total organic carbon (TOC) or loss on ignition (LOI) content of the slag and bottom ashes must not be greater than 3% or 5%, respectively, of the dry weight of the material.

Waste feed interlocks are required to prevent waste from being fed to the facility when the required temperature has not been reached either at start-up or during operation.



## Emission standards

Energy recovery facilities must achieve emission performance consistent with best practice. Energy recovery facilities must be designed and operated to ensure they achieve air emissions no greater than the standards prescribed in Table 1.

**Table 1 Emission standards for energy recovery facilities**

Pollutant	Concentration <sup>1</sup>	Averaging period
Solid particles (total)	20 mg/m <sup>3</sup>	One hour or the minimum sampling period specified in the relevant test method, whichever is the greater
Type 1 and 2 substances in aggregate	0.3 mg/m <sup>3</sup>	One hour or the minimum sampling period specified in the relevant test method, whichever is the greater
Mercury	0.04 mg/m <sup>3</sup>	One hour or the minimum sampling period specified in the relevant test method, whichever is the greater
Cadmium and Thallium (total)	0.02 mg/m <sup>3</sup>	One hour or the minimum sampling period specified in the relevant test method, whichever is the greater
Dioxins and furans	0.1 ng/m <sup>3</sup>	One hour or the minimum sampling period specified in the relevant test method, whichever is the greater
Sulphur dioxide (SO <sub>2</sub> )	100 mg/m <sup>3</sup>	One hour
Oxides of nitrogen (NO <sub>x</sub> ) (as NO <sub>2</sub> equivalent)	250 mg/m <sup>3</sup>	One hour
Carbon monoxide (CO)	80 mg/m <sup>3</sup>	One hour
Hydrogen chloride (HCl)	50 mg/m <sup>3</sup>	One hour
Hydrogen fluoride (HF)	4 mg/m <sup>3</sup>	One hour
Volatile organic compounds (VOCs)	20 mg/m <sup>3</sup>	One hour
Ammonia	5 mg/m <sup>3</sup>	One hour

Notes: <sup>1</sup> Expressed at dry, 273 K, 101.3 kPa and 11 % Oxygen

## Process monitoring

There must be **continuous measurements** of the operational parameters listed in Table 2. This process monitoring data must be held by the proponent for a period of three years.

**Table 2** Operational parameter monitoring requirements for energy recovery facilities

Operational parameter	Location	Frequency
Temperature	Representative point in the combustion chamber	Continuous
Oxygen content	Discharge stack	Continuous
Moisture content	Discharge stack	Continuous
Pressure	Discharge stack	Continuous

## Proof of performance (POP)

As part of the environment protection licence conditions of all energy recovery facilities, the EPA will require operators to complete proof of performance (POP) testing to demonstrate compliance with air emissions standards. Proponents must provide a commissioning plan during the environment protection licence application stage, detailing the POP emission testing that will be undertaken.

## Emissions monitoring

Following successful plant commissioning, including POP testing, the EPA will require operators to undertake ongoing monitoring to demonstrate compliance with air emission standards. The minimum emissions monitoring requirements are listed in Table 3. The EPA may set more stringent monitoring requirements in conditions of the Environment Protection Licence, including but not limited to continuous monitoring of additional pollutants, where feasible monitoring techniques become available

**Table 3** Minimum emissions monitoring requirements for energy recovery facilities

Pollutant	Unit of measure	Frequency
Oxides of nitrogen (NOx)	mg/m <sup>3</sup>	Continuous
Carbon monoxide (CO)	mg/m <sup>3</sup>	Continuous
Solid particles (Total)	mg/m <sup>3</sup>	Continuous
Total organic compounds	mg/m <sup>3</sup>	Continuous
Hydrogen chloride (HCl)	mg/m <sup>3</sup>	Continuous
Hydrogen fluoride (HF)	mg/m <sup>3</sup>	Continuous
Sulphur dioxide (SO <sub>2</sub> )	mg/m <sup>3</sup>	Continuous
Type 1 and 2 substances in aggregate	mg/m <sup>3</sup>	Every three months
Mercury	mg/m <sup>3</sup>	Every three months
Cadmium and Thallium (Total)	mg/m <sup>3</sup>	Every three months
Polycyclic aromatic hydrocarbons (PAH)	mg/m <sup>3</sup>	Every three months for the first 12 months of operation. Two measurements per year after that.
Dioxins and furans	ng/m <sup>3</sup>	Every three months for the first 12 months of operation.

Two measurements per year after that.

Notes: The continuous measurement of HF may not be required if treatment stages for HCl are used which ensure that the emission limit value for HCl is not being exceeded.

## Emissions reporting

Emission monitoring data must be made available publicly through an online portal in real time.

Emission monitoring data must be made available to the EPA in real time graphical publication and a weekly summary of continuous monitoring data and compliance with emissions limits published on the internet.

## Air emission modelling assessment

An air quality impact assessment must be completed according to the [Approved Methods for the Modelling and Assessment of Air Pollutants in NSW](#).

## Thermal efficiency criteria

This policy statement is restricted in its scope to facilities that are designed to thermally treat waste for the recovery of energy rather than as a means of disposal. The **net** energy produced from thermally treating that waste, including the energy used in applying best practice techniques, must therefore be positive.

To meet the thermal efficiency criteria, facilities must demonstrate that at least 25% of the energy generated from the thermal treatment of the material will be captured as electricity (or an equivalent level of recovery for facilities generating heat alone).

Energy recovery facilities must also demonstrate that any heat generated by the thermal processing of waste is recovered as far as practicable. This includes use of waste heat for steam or electricity generation or for process heating of combined heat and power schemes.

## Resource recovery criteria

The EPA considers energy recovery to be a complementary waste management option for the residual waste produced from material recovery processes or source-separated collection systems.

This policy statement's objectives in setting resource recovery criteria are to:

- promote the source separation of waste where technically and economically achievable
- drive the use of best practice material recovery processes
- ensure only the residual from genuine resource recovery operations are eligible for use as a feedstock for an energy recovery facility.

Energy recovery facilities may only receive feedstock from waste processing facilities or collection systems that meet the criteria outlined in Tables 4 and 5.

Proponents wishing to use waste or waste-derived materials for energy recovery that are not defined in Tables 4 or 5 must contact the EPA to discuss their proposal. The EPA will consider these on a case-by-case basis according to the energy from waste considerations outlined in this policy statement and the principles set out in the POEO Act and WaRR Act.

**Table 4 Resource recovery criteria for energy recovery facilities – mixed waste streams**

Mixed waste stream	Processing facility	% residual waste allowed for energy recovery
Mixed municipal waste (MSW)	Facility processing mixed MSW waste where a council has separate collection systems for dry recyclables and food and garden waste	No limit by weight of the waste stream received at a processing facility
	Facility processing mixed MSW waste where a council has separate collection systems for dry recyclables and garden waste	Up to 40% by weight of the waste stream received at a processing facility
	Facility processing mixed MSW waste where a council has a separate collection system for dry recyclables	Up to 25% by weight of the waste stream received at a processing facility
Mixed commercial and industrial waste (C&I)	Facility processing mixed C&I waste	Up to 50% by weight of the waste stream received at a processing facility
	Facility processing mixed C&I waste where a business has separate collection systems for all relevant waste streams	No limit by weight of the waste stream received at a processing facility
Mixed construction and demolition waste (C&D)	Facility processing mixed C&D waste	Up to 25% by weight of the waste stream received at a processing facility
<b>Residuals from source-separated materials</b>		
Source-separated recyclables from MSW	Facility processing source-separated recyclables from MSW	Up to 10% by weight of the waste stream received at a processing facility
Source-separated garden waste	Facility processing garden waste	Up to 5% by weight of the waste stream received at a processing facility
Source-separated food waste (or food and garden waste)	Facility processing source-separated food or source-separated food and garden waste	Up to 10% by weight of the waste stream received at a processing facility

**Table 5 Resource recovery criteria for energy recovery facilities – separated waste streams**

Separated waste stream	Feedstock able to be used at an energy recovery facility
Waste wood	Residual wood waste sourced directly from a waste generator e.g. manufacturing facility
Textiles	Residual textiles sourced directly from a waste generator
Waste tyres	End-of-life tyres
Biosolids	Used only in a process to produce a char for land application
Source separated food and garden organics	Used only in a process to produce a char for land application

## Notes

The EPA may consider increases to the maximum allowable percentage of residuals from facilities receiving mixed municipal and commercial and industrial waste where a facility intends to use the biomass component from that process for energy recovery, rather than land application. The facility must be able to demonstrate they are using best available technologies for material recovery of that stream.

Waste streams proposed for energy recovery should not contain contaminants such as batteries, light bulbs or other electrical or hazardous wastes.

Bio-char or char materials produced from facilities using mixed waste streams will not be able to be considered for land application as a soil amendment or improvement agent.

The C&I no limit category is likely to apply only to mixed waste collected from single generators of large volumes of waste (e.g. supermarkets) or precinct-based businesses (e.g. shopping centres). Proponents will need to demonstrate that each entity generating waste has effective and operating collection systems for all waste streams they generate that have reuse or recycling opportunities (e.g. paper/cardboard collection; organic collection; and residual waste collection). Proponents wishing to use the C&I no limit category will need to contact the EPA to determine the eligibility of each entity.