

Consultation Report: Proposed changes to the NSW Energy from Waste Policy Statement

What the consultation covered

The NSW Energy from Waste Policy Statement (the Policy) sets out the overarching framework and criteria that apply to facilities in NSW proposing to thermally treat waste or waste-derived materials for the recovery of energy.

The NSW Minister for Energy and Environment requested the Chief Scientist and Engineer to provide independent expert advice on energy recovery facilities and related environmental protection frameworks. This was to ensure facilities in NSW undertake robust assessments and adopt international best practice standards and controls to ensure human health and the environment are protected.

The Energy from Waste report from the Chief Scientist and Engineer delivered a review of energy from waste in NSW. It made a number of recommendations to ensure proposals adopt international best practice standards and controls to protect human health and the environment.

What were the proposed changes to the draft NSW Energy from Waste Policy Statement?

The EPA consulted on proposed changes to the Policy that reflected the air emission limits recommended by the Chief Scientist and Engineer.

The main proposed change to the Policy was the inclusion of world's best-practice air pollution emission limits. These limits are listed in Table 1 of the final Policy. The specific emissions limits that have been strengthened include heavy metals, cadmium and thallium, mercury and hydrogen fluoride. Emission monitoring requirements have also been strengthened.

Additional minor amendments were also proposed that modernised the language and readability of the Policy.

What is included in this document?

This document provides a summary of key issues raised by stakeholders during public consultation on the proposed changes to the Policy and the EPA's response. The EPA's response includes a number of additional new amendments to the Policy based on the feedback received via the consultation process.

This report has divided the EPA's response to key issues into two overarching categories. These are:

- the EPA's response to technical themes raised through the consultation
- the EPA's response to broader energy from waste themes raised through the consultation.

What was the consultation process?

The consultation was conducted by the EPA from 31 March to 30 April 2021. Stakeholders were invited to provide feedback by survey responses on the proposed changes through the [EPA's Have Your Say web page](#) or by emailing submissions to the EPA.

During the consultation the EPA:

- invited feedback from 162 stakeholders
- held nine individual meetings with industry stakeholders

- held four information briefings with energy from waste proponents, waste industry and councils.

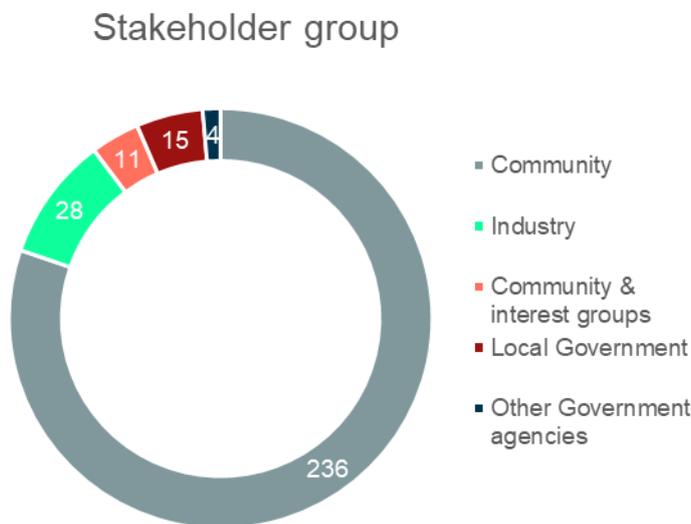
The consultation resulted in:

- 1,559 visitors to the online consultation 'Have Your Say' webpage
- 190 survey responses
- 136 written submissions.

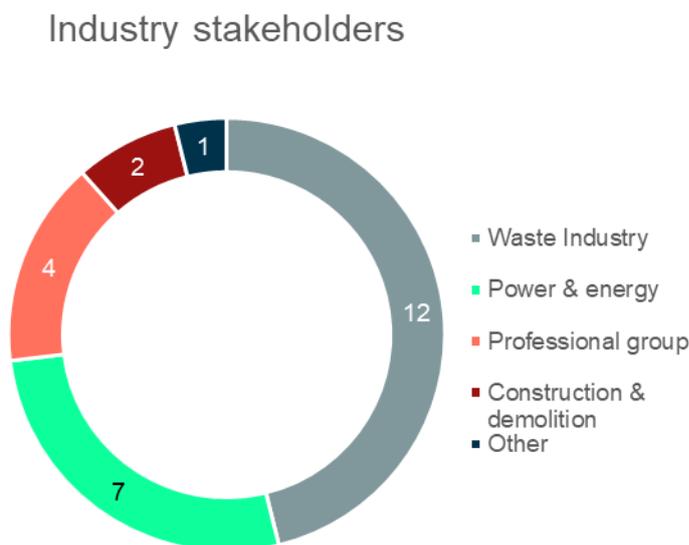
Consultation feedback results

Who did we hear from?

The EPA received 326 submissions (both Have Your Say surveys and written submissions) from government agencies, local government, waste and energy industry members, community and interest groups and community members during the consultation period. A breakdown of these submissions by stakeholder type is presented below.



Of the 28 submissions received from industry, 12 were from the waste industry with the remaining submissions from other industry sectors as below.



Key survey results – ‘Have Your Say’

The Have Your Say consultation page invited stakeholder comments on three specific questions:

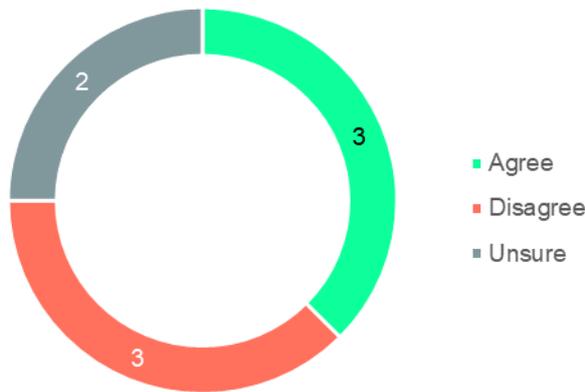
1. Are the proposed changes to the NSW Energy from Waste Policy Statement sufficiently clear?
2. Are the proposed changes to the NSW Energy from Waste Policy Statement capable of being implemented?
3. Do you have any other comments on the implementation of the proposed changes to the NSW Energy from Waste Policy Statement?

The results of questions one and two are presented below with responses from community members and industry presented separately.

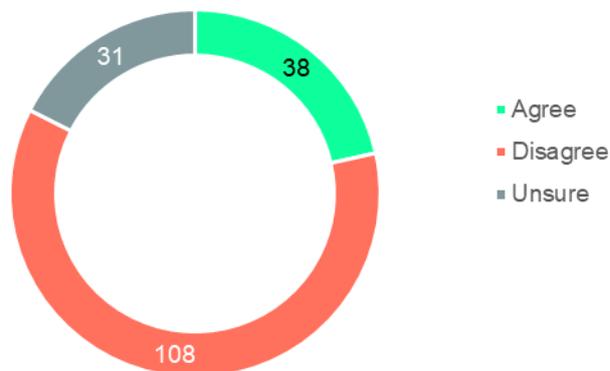
Note: the results are from the Have Your Say survey only and do not include written submissions emailed to the EPA which provided broader responses than the three survey questions.

Question 1. Are the proposed changes to the NSW Energy from Waste Policy Statement clear?

Industry response

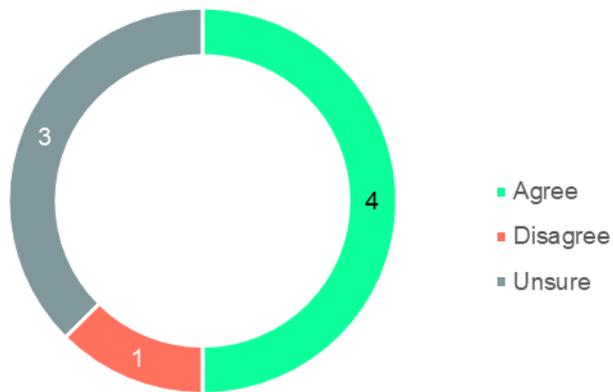


Community response

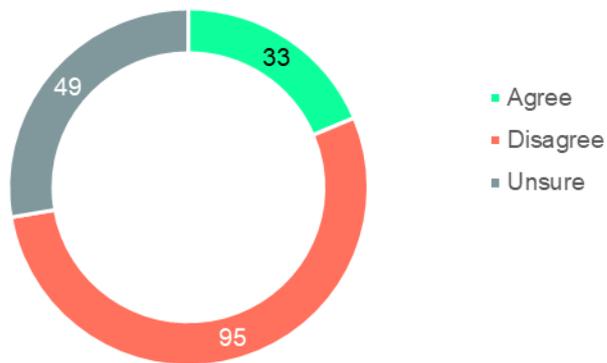


Question 2. Are the proposed changes to the NSW Energy from Waste Policy Statement capable of being implemented?

Industry response



Community response



The EPA's response to technical themes raised through the consultation

Introductory statement

In reviewing the submissions, the EPA categorised the technical issues associated with the draft Policy changes into the following themes:

- Emission standards
 - Standards not stringent enough
 - Scope of the pollutants covered in the policy
 - Standards too stringent
 - Application of the draft energy from waste emission standards
- Monitoring requirements
- Other than normal operating conditions (OTNOC)
- Reference facility requirements.

The foundational basis for many issues raised by stakeholders was that the draft Policy did not adopt all or part of the regulatory framework from other jurisdictions, particularly the European Union (EU), where energy from waste is more common. In very few instances did the submissions include substantial analysis or data to support the technical issues raised about the implementation of the policy changes.

The EPA does not believe it is appropriate to simply adopt the regulatory framework for energy from waste facilities from other jurisdictions, which are based on different environmental, social and economic settings. The EPA considers that the Policy must be compatible and complimentary to the existing NSW legislative framework, including existing NSW air pollution legislation and regulations. The finalised policy settings aim to provide increased transparency and certainty to industry and the community without introducing unnecessary technical complexity.

Amendments to the final Policy

The EPA has incorporated several new amendments into the final Policy in response to the feedback received on the draft Policy. These new amendments are outlined under each of the main theme conclusions below. Each conclusion also lists the relevant section of the Policy to which the amendment applies.

Emission limits

Emission limits contained in the draft Policy are not stringent enough

Various submissions raised concerns that the proposed emission limits contained in Table 1 of the draft Policy were not stringent enough. These submissions were principally made by community stakeholders. In particular, submissions noted that:

- the proposed draft emission limits are greater than the 'long term' emission levels (e.g. mercury) outlined in the European Best Available Techniques (BAT) reference document
- the proposed draft emission limits are greater than emission limits in other jurisdictions. In particular the emission limit values for particulate matter in the European Union were cited
- the policy should additionally include emission limits for longer-term average emissions, including 24-hour averages.

The EPA recommends a significant degree of caution be applied when comparing numerical emission limit values, including comparing emission standards across jurisdictions. It can be misleading to compare standards solely based on the numerical value, e.g. 5, 10 or 20 mg/m³. A genuine like-for-like

comparison requires consideration of the entirety of the implementation framework rather than individual components, which risks taking standards out of context.

Some factors that confound comparison of emission standards between jurisdictions include:

- units of measure
- limit percentiles
- averaging periods
- reference conditions (temperature, pressure, reference gas correction, etc.)
- monitoring requirements
- allowable exceedances or statistical analysis applied to a standard
- treatment of monitoring data – including allowance for monitoring uncertainty
- jurisdictional discretion imbedded in the regulations.

The Office of the Chief Scientist and Engineer's (OCSE) Report and the associated expert review found that the final draft NSW energy from waste limits, and supporting implementation framework, are equivalent to or more stringent than leading jurisdictions. The EPA supports this finding and is implementing it via the revised Policy.

In many cases, stakeholders have specifically looked to the EU framework including the Industrial Emissions Directive (IED) and the BAT conclusions as a comparator for NSW.

The IED is not rigidly prescriptive on the application of EU BAT level(s) including long term levels and allows the local permitting authority some discretion in setting permit conditions that derogate from the BAT conclusions. As such the EU does not mandate the adoption of the BAT values referenced in stakeholder submissions.

Submissions compared the one-hour average NSW standards to EU standards and levels that are applied over an averaging period of a day or weeks. The EPA advises that the validity of this type of comparison is highly questionable. Additionally, from a compliance perspective, it is uncertain whether the longer-term average levels imbedded in the EU framework (e.g. 5–10 mg/m³ for particle emissions) are achievable when applied on a more stringent one-hour basis.

The emission standards listed in the NSW Policy allow for reasonable and expected variation in emission performance over short periods. These limits are complimented by legislative requirements to operate and maintain plant in a proper and efficient manner, which will assist with driving down average emissions.

The Policy requires best practice process design and emission control and excludes thermal treatment of hazardous waste. As such it is expected that mercury and particle emissions will be relatively low and stable. The Policy requires a commissioning plan, rigorous proof of performance testing and ongoing monitoring and reporting to verify this outcome.

Conclusion

Changes made relate to Section 4 sub-heading 'Emissions Standards' of the Policy

The final Policy has retained the draft emission standards as recommended by OCSE. Following consideration of issues raised about stringency of emission standards in the Policy, the EPA has amended the Policy to clarify that the EPA may set additional emission limits or conditions in the Environment Protection Licence. These additional limits will be based on project specific risk factors, the required best practice determination completed for each project and/or the aim of promoting reduced lower average emissions and continuous improvement for energy from waste projects.

Emission limits do not cover all pollutants

Some submissions expressed concern that the emission standards contained in the draft Policy do not cover all pollutants. Specifically, submissions raised that the draft Policy did not include emission limits for:

- fine particulates (PM_{2.5}), those with a diameter less than 2.5 micrometres
- metals, such as antimony, arsenic and lead.

The draft Policy implemented the recommendations made by OCSE. The OCSE report provides detailed advice on the issue of fine particulates. Broadly the OSCE advice is that:

- point source emissions for particulates from industrial plants are measured as total solid particles, capturing all size fractions. This is consistent with practice in leading jurisdictions, including the USA and EU
- industrial processes that use best available technology air pollution controls can achieve a high level of control for fine particulate (including PM2.5) fractions.

The EPA accepts the OSCE advice and recommendation and has therefore retained a limit for total solid particles in the final Policy as the primary indicator of emission performance for particulate emissions of all size fractions.

Additionally, proponents seeking to construct and operate an energy from waste facility in NSW are required to undertake detailed technical assessments. Air Quality Impact Assessments typically assess potential impacts based on conservative assumptions, which can include an assumption that all particulate matter emitted is in the fine fraction range. In doing so, the technical assessments can provide a conservative estimate to the potential impacts for fine particulates. For example, the publicly exhibited technical assessment for the proposed Mt Piper Energy Recovery Project included such estimates.

The Policy includes an emission limit for Type 1 and 2 substances in aggregate. Type 1 and 2 substances are defined in the Protection of the Environment Operations (Clean Air) Regulation and include antimony, arsenic and lead.

The EPA recognises that a policy cannot codify all potential pollutants emitted from an industrial process, including all forms of energy from waste facilities. The final Policy lists the common pollutants emitted from relevant industrial processes and sets limits for these pollutants. The pollutants identified in the final Policy are consistent with those regulated by leading international jurisdictions.

Additionally, as discussed above, proponents seeking to construct and operate an energy from waste facility in NSW are required to undertake detailed technical assessments which include a process description and identification of pollutants of potential concern relevant to the individual project. Where necessary, additional pollutants can be assessed, and limits imposed under the current assessment and regulatory framework.

Conclusion

Changes made relate to Section 4 sub-heading 'Emissions Standards' of the Policy

The final Policy has retained the draft emission standards as recommended by OCSE. Following consideration of issues about the breadth of air pollutants covered in the Policy, the EPA has amended the Policy to clarify that the EPA may set limits for additional pollutants in the Environment Protection Licence. These additional limits will be based on project specific design, assessment and risk factors.

Emission limits contained in the draft Policy are too stringent and/or present compliance challenges

Some submissions expressed a view that the draft emission standards may be too stringent and/or compliance with the limits may be difficult, depending on the implementation framework. These submissions were principally made by industry stakeholders.

In particular, submissions raised concerns about achieving compliance with the proposed draft emissions limits, due to such factors as:

- the non-homogenous nature of waste fuel may limit the ability to achieve 100% compliance with the draft emission standards
- the draft emission standards are close to the detection limits of monitoring equipment from some pollutants
- the stringency of some emission standards, particular carbon monoxide (CO) and ammonia (NH₃)
- the policy does not allow for an alternative suite of limits that could be considered to deliver better health-based outcomes
- measurement/monitoring uncertainty and the allowance for this in determining compliance

- without clarity around the definition of other than normal operating conditions and the application of proposed emission limits outside normal operating periods, 100% compliance with emission limit values is not practical.

As many of the issues relating to the stringency of the Policy emission standards relate to the implementation or application of the standards, readers should additionally refer to the sections on application of the draft energy from waste emission standards and other than normal operating conditions.

The EPA recognises that waste derived material is not necessarily as homogeneous as other fuel types. The Policy provides an integrated framework to address issues around homogeneity of waste material and associated emission consequences through:

- waste receipt arrangements, including requiring waste separation and pre-processing prior to undertaking thermal treatment
- requirement for best practice process design
- setting plant operation criteria, including minimum temperature requirements and limitation on waste feed to prevent the generation of hazardous air pollutants under unfavourable combustion conditions
- requirement for best practice pollution controls.

The draft Policy did not amend these requirements. These requirements work collectively to manage environmental risks associated with the use of waste derived fuel, including the risks associated with emission variability due to non-homogenous fuel.

Additionally, the OCSE report recommended that proponents of energy from waste facilities develop a waste input sampling and monitoring program which could be implemented as a condition of approval for any energy from waste proposal.

The EPA considers that a facility that robustly incorporates the requirements under the Policy and a waste input sampling and monitoring program would minimise emission risks associated with the homogeneity of feedstock.

The EPA has considered publicly available emission data and particularly the expected/routine emission performance information included in recent energy from waste project applications¹. This includes data presented for expected case assessment scenarios and data presented for reference facilities. Available data shows that the expected emission performance of new energy from waste facilities is significantly lower than the emission standards in Table 1 of the draft Policy. For example, the tabulated data below compares expected/routine emission performance to the emission standards in the draft Policy.

Air pollutant	Routine emission performance	Policy emission standard
Solid particles	< 5 mg/m ³	20 mg/m ³
Metals	<= 0.1 mg/m ³	0.3 mg/m ³
Mercury	< 0.01 mg/m ³	0.04 mg/m ³
Cadmium and thallium	< 0.002 mg/m ³	0.02 mg/m ³
Dioxins and furans	< 0.04 ng/m ³	0.1 ng/m ³
Sulphur dioxide	< 25 mg/m ³	100 mg/m ³
Carbon monoxide	< 20 mg/m ³	80 mg/m ³
Hydrogen chloride	< 10 mg/m ³	50 mg/m ³
Hydrogen fluoride	< 1 mg/m ³	4 mg/m ³
Volatile organic compounds	< 2 mg/m ³	20 mg/m ³
Oxides of nitrogen	< 210 mg/m ³	250 mg/m ³
Ammonia	< 5 mg/m ³	5 mg/m ³

¹ *Western Sydney Energy and Resource Recovery Centre, Environmental Impact Statement, dated 23 September 2020*
Mt Piper Energy Recovery Project, Environmental Impact Statement, dated 9 December 2019

Tolvik (2021) provides a summary of emission performance of energy from waste facilities in the UK. Aggregated emission data from existing UK energy from waste facilities indicates observed average emissions are less than 30% (range 4%–80%) of the relevant emissions standards.

It is noted that for some pollutants, such as oxides of nitrogen (NO_x) that are controlled by the dosing rate of consumable reagents, international experience indicates that operators optimise the reagent consumption against achieving emission levels with the specified limits (Tolvik 2021)². As such, where there is a regulatory imperative, further abatement could be achieved via selection of alternate control methods and/or enhanced reagent dosing.

Factoring the expected emission performance (above) along with the requirement for best practice process design and emission control; proper and efficient operation of plant and equipment; and requirements to control feedstock and thermal process conditions, the EPA believes that the draft emission standards provide a realistic margin to enable compliance, even when reasonable and foreseeable process variability occurs. The EPA believes this would be particularly the case for new plant which have been purpose built and operated to comply with the emission standards.

Conclusion

Changes made relate to Section 4 sub-heading 'Emissions Standards' of the Policy

The final Policy has retained the draft emission standards as recommended by OCSE. Following consideration of issues raised about stringency of emission standards, the EPA has amended the Policy to clarify that the EPA may set additional emission limits or conditions in the Environment Protection Licence. These additional limits or conditions will be based on project specific risk factors, the required best practice determination completed for each project and/or the aim of promoting reduced lower average emissions and continuous improvement for energy from waste projects.

Application of the draft emission standards

Various submissions raised issues about the application of the draft emission standards in the Policy. Specifically, submissions raised:

- Measurement/monitoring uncertainty and the allowance for this in determining compliance with emission standards
- The use of short term (one hour) emission standards may cause perverse policy outcomes by increasing potential longer-term average emissions
- The use of short term (one hour) based emission standards and monitoring requirements, is not consistent with best practice and other jurisdictions. Multiple averaging periods provide a better reflection of how a plant is operating which provide confidence to the community on emissions performance
- Ammonia limit may potentially result a perverse outcome in limiting the reduction in NO_x emissions.

Regard measurement uncertainty, various submissions made reference to how measurement uncertainty is handled in other jurisdictions. In particular, submissions made reference to the EU where uncertainty is typically handled by subtracting a determined value (e.g. by applying a 20% factor or calculating a confidence interval around the measured data point) from the measured result. This approach essentially provides leniency for determining compliance with the emission standard. In reality, measurement uncertainty will apply equally in both directions of a measured value, in that the true value may be equal to, higher or lower than the measured value. No submission provided a compelling reason for adjusting the measured data downward and the EPA is not aware of the origin of this practice in other jurisdictions. In the NSW context, the existing NSW regulatory framework does not include provisions allowing for measured emission values to be adjusted downward. This applies across all industry sectors regulated by the EPA.

The EPA has considered recommendations in submissions calling for longer term averaging periods and additionally considered advice provided by in the OCSE peer review. The OCSE peer review recommends that the Policy adopt a single set of limits initially and subsequently review the need for

² UK Energy from Waste Statistics – 2020, prepared by Tolvik Consulting, dated May 2021

additional limits across multiple averaging periods. The EPA has accepted the OCSE review recommendation and retained the single set of emission standards in the final Policy.

However, noting the expected emission performance of new energy from waste facilities (discussed above); stakeholder recommendation for 24 hour limits; Continuous Emission Monitoring requirements; and the requirement for a best practice emission control review during the planning stages of an energy from waste project, the EPA has amended the final Policy to enable additional emission limits (including 24-hour limits) to be applied in licences on a project specific basis. The changes are outlined in the below conclusion.

Additional limits may help to drive continual improvement and result in reduced average emissions and ensure compliance with the legislative requirement to maintain and operate plant in a proper and efficient manner.

Various submissions raised concerns about the proposed emission standard of 5 mg/m³ (as a one-hour average) for ammonia. In particular, the submissions raised concerns that the ammonia limit maybe counter-productive in facilitating NO_x emission abatement from some pollution abatement technology.

Ammonia emissions are primarily a by-product of the abatement system rather than a primary emission generated due to the thermal treatment of waste. As such, the focus should be on ensuring proper, efficient and stable operation of the emission abatement system.

Ammonia (or urea) is injected into the process as part of the emission abatement system. Ammonia works as a reducing reagent in the system to control NO_x. This can occur in the presence of a catalyst (Selective Catalytic Reduction) or in the absence of a catalyst (Selective Non-Catalytic Reduction). During the use of these technologies the dose of ammonia must be large enough to ensure effective NO_x control and the dose may be varied according to the process conditions in the EfW plant at a given point in time. A small amount of ammonia is typically carried over into the emission stream due to the incomplete reaction between NO_x and ammonia. This is called ammonia slip and should be minimised to the extent practicable.

The ammonia limit adopted in the draft Policy was intended as a driver to promote the use of Selective Catalytic Reduction (SCR) technology which has a greater NO_x control efficiency when compared to other NO_x abatement techniques. The use of a catalyst results in two primary advantages of the SCR process over other pollution controls such as Selective Non-Catalytic Reduction (SNCR); higher NO_x control efficiency and abatement reactions within a lower and broader temperature range (United States Environmental Protection Agency)³.

The EU BAT reference document advises a BAT AEL range of 2–10 mg/m³ (24-hour average) for ammonia, with the implementation of either SCR or SNCR. The EU BAT also provides broad advice that the lower end of the range can be achieved using SCR, and that in some instances the use of SNCR the higher end of the emission performance may be 15 mg/m³.

The EPA recognises the relationship between NO_x control and ammonia slip and the need to optimise the performance of the air pollution abatement system. Further, the EPA recognises the need to ensure stable and consistent operation of the NO_x abatement system to reduce average emissions. This is assisted by continuous emission monitoring of NO_x and ammonia, as required by the Policy.

During the planning phase of an energy from waste project, proponents must undertake a best practice determination. In undertaking the best practice determination for NO_x abatement techniques proponents should consider, the NO_x reduction that will be achieved, the Green House Gas (GHG) performance (including potential for N₂O emissions), and ammonia slip to demonstrate that the proposed technology achieves the most desired environmental outcome.

³ United States Environmental Protection Agency Air Pollution Control Technology Fact Sheet, Selective Catalytic Reduction

Conclusion

Changes made relate to Section 4 sub-heading 'Emissions Standards', Table 1 and Table 3 of the Policy

Having considered the available information and submissions, the EPA has amended the final Policy to apply the 5mg/m³ ammonia limit on a 24-hour basis, which is a stringent requirement compared with leading jurisdictions.

Additionally, having considered the submissions, the EPA has amended the Policy to clarify that the EPA may set additional and/or more stringent emission limits in the environment protection licence on a project specific basis, including 24-hour NO_x limits to promote lower average emissions and continuous improvement.

The EPA has added a continuous emission monitoring requirement of ammonia, nitrous oxide (N₂O) and carbon dioxide (CO₂) to ensure more robust verification of the proper and efficient operation of the air pollution abatement system.

Monitoring requirements

Monitoring frequency not sufficiently stringent

Various submissions raised concerns that the frequency for monitoring of some pollutants was not sufficiently stringent. Submissions specifically mentioned:

- Other jurisdictions require continuous monitoring for heavy metals. The draft Policy proposed periodic sampling for heavy metals.
- Persistent organic pollutants, including dioxins, should be monitored continuously.

In support of their view, submissions made reference to continuous monitoring requirements in the EU.

The EU IED specifies continuous monitoring requirements for some air pollutants such as particulates and oxides of nitrogen. The EU IED specifies at least two measurements per year of heavy metals and dioxins and furans (a persistent organic pollutant), with a more onerous frequency of quarterly during the first 12 months of operation. The EU IED does not mandate continuous monitoring requirements for metals or dioxins and furans.

The EPA notes that the EU IED does include some provision for setting a date from which continuous measurements of heavy metals and dioxins and furans is to be conducted. However, the EPA understands that a starting date for these monitoring requirements has not yet been set because appropriate measurement techniques are not available.

The EU BAT reference document highlights BAT monitoring requirements as determined through the EU regulatory framework. The EU BAT reference document outlines a periodic monitoring frequency of once every six months for metals and metalloids, and once every six months for dioxins and furans. The EPA recognises that the EU BAT reference document does identify continuous monitoring for mercury as best practice, however the EU BAT reference document also identifies that periodic monitoring may replace continuous mercury monitoring where waste material being incinerated has a proven low and stable mercury content. In other words, periodic monitoring can be used where the risk of significant mercury emissions is low and at the discretion of the permitting authority based on project specific considerations.

For NSW, the *Approved Methods for Sampling and Analysis of Air Pollutants in NSW* (Approved Methods for Sampling) lists the statutory methods for monitoring industrial emissions. The EPA is currently consulting on a revision draft to the *Approved Methods for Sampling* which include a continuous mercury monitoring method, which may be used depending on the project specific risk profile.

The draft *Approved Methods for Sampling* does not include a continuous measurement method for dioxins. The EPA's current view is that continuous measurement techniques for dioxins is not mature enough to enable practicable implementation on a commercial basis. This is supported by the USEPA not having promoted a CEMS method for dioxins. However, the final Policy requires continuous measurement of VOCs, CO and halogens (including HCl) which collectively act as a form of surrogate for persistent organic pollutant monitoring.

Section 4 of the draft Policy statement outlines the technical provisions for Energy Recovery Facilities. Section 4 states that “*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*”. During the planning phase of energy from waste proposals, proponents are required to undertake detailed technical assessments. Should a project identify a specific risk factor during this process the EPA can require more onerous monitoring requirements as flagged in the Policy.

Additionally, is it the EPA’s expectation that energy from waste industries and proponents continue to review and evaluate monitoring methods as they become more scientifically established and more commercially available.

Conclusion

The Policy retains wording that 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.

Realtime emission data reporting

Submissions raised concerns around the requirements for publishing emission data in real-time. Specifically, submissions:

- sought further clarification around what constitutes ‘real-time’
- expressed concerns with interpretation of published real-time data without context to the operational environment
- identified risks from publishing of data that has not been validated/quality assured.

Some submissions also suggested that the requirements for publication should be a summary of continuous emission monitoring data per week or daily.

The OCSE recommended that any approved facilities should be required to make emissions data publicly available in real time and online. The OSCE report identified that online reporting of real-time data provided transparency and information to the public about emissions. The EPA supports the intent of this recommendation.

Additionally, the OCSE report identified that online real-time public reporting is not unusual and identified existing plants which provide continuous real time monitoring data online for half-hourly and daily emissions. The IKW Rudersdorf energy from waste facility and the Dublin Covanta facility were referenced in the OCSE report. The EPA notes that the environmental permit for the Dublin Covanta Plant sets the conditions relating to publication of real time data.

The EPA agrees that only data which has been the subject of some quality assurance should be published. The EPA expects that modern continuous emission monitoring systems, including the measurement and data management systems, will have data validation and QA/QC methods to validate real-time data as it becomes available. It expected that these data systems will have automated checks and flagging embedded that serves as an initial quality assurance screening procedure. The EPA notes that the portal for publication of the emission data for the Dublin Covanta Plant advises that emission data for that facility has not undergone final verification or complete quality control and quality assurance procedure⁴.

To alleviate potential concerns around broader interpretation of the emission data published in real-time, energy from waste operators may also publish complimentary information on the operation conditions of the energy from waste facility. For example, proponents could also publish information on whether the plant is in a start-up or shutdown period, the furnace operating temperature and whether waste is being processed.

⁴ <https://www.dublinwastetoenergy.ie/about-the-facility/emissions-data>

Conclusion

Changes made relate to Section 4 sub-heading 'Emissions Reporting of the Policy'

Having regard to the concerns raised on emission reporting in real time, the EPA has made minor amendments to the policy to clarify to the extent practicable validated emission monitoring must be made available publicly in near real time.

Other than normal operating periods

Other than normal operating periods not defined

Industry stakeholder submissions raised that the Policy did not provide sufficient detail and definition of other than normal operating conditions. This was raised in particular around the application of the draft Policy emission standards during other than normal operating periods.

Specific concerns raised included:

- The policy does not provide a definition of other than normal operating conditions (OTNOC), including definitions around start-up/shutdown and abnormal operations. In particular, clarity was sought on the basis of the application of the emission standards and reporting of emissions during these periods
- 100% compliance with emission standards given the lack of definition of other than normal operating conditions could potentially cause perverse environmental outcomes where operators of energy from waste facilities are required to shutdown/start up more frequently.

Stakeholders made recommendations about ways to address OTNOC in the final Policy, including:

- Recommending a definition of normal operating conditions and/or OTNOC be included in the policy which is more specific than the definition of start-up and shutdown contained in the NSW Clean Air Regulation
- Recommending that the EU framework be adopted
- Recommending that alternative emission standards, such as percentiles be used
- Prescribing a length of time allowable for an OTNOC event
- Some submissions identified that operations relating to OTNOC could be dealt with on a project specific basis via licencing or conditions of approval.

Article 14 of the EU IED outlines that permits issued must include specific measures, which shall include:

(f) measures relating to conditions other than normal operating conditions such as start-up and shutdown operations, leaks, malfunctions, momentary stoppages and definitive cessation of operations.

The EPA notes that the EU IED does not provide an unambiguous definition of OTNOC for regulatory implementation. Rather, the EU allows for up to 60 hours per year where the plant can operate outside of normal operating conditions, with further consideration of OTNOC deferred to individual member states and their permitting system.

Additionally, the EPA notes that the EU IED includes allowance for the use of short-term percentile emission standards (e.g. 97th percentile of the 30-minute averages) but does not make a discernible association between the percentile limits and OTNOC.

The EU IED does outline operating conditions where waste feed into the combustion chamber must be avoided in particular circumstances, such as failure to achieved desired operating temperatures or failure of pollution abatement systems. The EPA supports such operating requirements, which can be implemented as licence conditions.

The OCSE expert reviewer advised it would not be ideal for NSW to simply adopt another jurisdiction's framework for managing OTNOC as the framework must be compatible with the local regulatory settings, including emission standards. The EPA supports this conclusion.

The OSCE expert review additionally recommended that industry be required to provide regulators with a management plan to control emissions during OTNOC periods, and to monitor and report emissions data

for OTNOC periods. Essentially, this requires that OTNOC be managed through licence conditions that are specifically relevant to the energy from waste technology and project under assessment.

In NSW there are existing air pollution provisions in the POEO Act which are directly relevant to OTNOC, including:

- Section 124 - operation of plant in a proper and efficient manner and an efficient condition
- Section 125 - maintenance work on plant in a proper and efficient manner
- Section 126 - dealing with material in a proper and efficient manner
- Section 128 (2) - carrying on any activity, or operating plant by such practicable means as may be necessary to prevent and minimise air pollution – where an emission standard does not apply.

The EPA expects that proponents implement necessary redundancy and contingency in the design of plant and equipment to fulfil these obligations. Additionally, it is expected that process design will include adequate management triggers and response mechanisms (including use of CEMS) to minimise the risk of out of control operations occurring.

Consistent with the recommendations made by the OCSE, the EPA will tailor project specific operating conditions in energy from waste facility licences. Specific operating conditions will be based on the principle of minimising air pollution. These conditions could include additional emission limits where warranted.

Conclusion

Changes made relate to Section 4, sub-heading Plant design and operation of the Policy

The Policy has been amended to explicitly state that the EPA will set project specific operating conditions for all approved energy from waste projects in the environment protection licence.

Monitoring does not cover other than normal operating conditions

Submissions questioned whether monitoring requirements in the draft Policy covered all operating conditions and times, including upset conditions, start-up and shutdown.

The Policy details operational parameter monitoring requirements and emission monitoring requirements in Table 2 and Table 3 respectively. The monitoring frequency is specified for each parameter and pollutant, and in many cases continuous monitoring is mandated by the final Policy. Where monitoring is required on a continuous basis, this means at all times and encompasses both normal and other than normal operating conditions, upset conditions, start-up and shutdown.

In addition to the minimum monitoring requirements specified in the Policy, the EPA may prescribe additional monitoring and reporting requirements in an environment protection licence. These additional requirements are based on individual project plant and operating characteristics informed by the outcomes of detailed assessments undertaken on an individual project basis at the project planning and design phase.

Conclusion

The Policy retains requirements for continuous emission monitoring.

Reference facility

Some submissions questioned the practicalities of finding a reference facility given the difference in emission standards proposed in NSW as compared with other jurisdictions (such as the EU), where an energy from waste industry is well established. In particular, submissions raised concerns with finding a reference facility on the basis that the NSW Policy emission standards are applied on a one-hour basis as compared with other jurisdictions which use a combination of half hourly, daily and percentile limits; report adjusted monitoring data and make allowance for abnormal operating conditions.

In considering this issue, the EPA firstly notes that the reference facility requirements in the revised policy have not changed from the previous version of the policy.

Figure 1 of the 'Guide to the NSW Energy from Waste Framework' (OCSE report, Appendix 5) sets out the assessment requirements and regulatory processes for energy from waste projects in NSW. Figure 1 indicates that proponents must demonstrate that a proposed project has technology that is proven, well understood and able to handle expected type and variability of feedstock. Further, these reference technology comparisons should have regard for the plant, waste inputs, air emission controls and wastes generated.

The EPA advises that the reference facility requirements in the existing policy are intended to provide a level of confidence in the overall plant design, plant process and performance in thermally treating waste. This includes, but is not limited to, benchmarking air emission performance.

Emission monitoring data can form a valuable part of demonstrating the performance of the proposed thermal treatment technology. The EPA considers that a difference in air quality regulation across international jurisdictions should not prevent emission comparisons and benchmarking. The EPA advises that this issue can be readily resolved through project specific data review and (re)analysis.

Conclusion

The Policy retains existing reference facility requirements. The Policy retains requirements for continuous emission monitoring.

The EPA's response to broader energy from waste themes raised through the consultation

A number of consultation submissions raised matters which relate to energy from waste more broadly but that were out of scope for the consultation. Table 1 summarises the broader issues raised and provides the EPA's response. Over two thirds of submissions received were opposed to energy from waste facilities in NSW. The EPA thanks stakeholders for these submissions and notes that the issues raised below, and other issues, will be considered as part of any future review of the broader Policy.

Table 1: Main issues raised regarding energy from waste more broadly

Item	Key messages	Stakeholder	Frequency	EPA response
1.	<p>Human health & protection of the environment</p> <ul style="list-style-type: none"> Protecting human health and preventing damage to the environment is an important issue Air quality near facilities needs to be maintained Concern over the risk of respiratory disease Need for long term evidence for health and environment Energy from waste proposals should require a health impact assessment to be completed before approval Concerns that energy from waste facilities may have a greater impact on human health and the environment compared to coal and gas due, to higher CO₂ emissions per unit of energy produced 	Community	High	<p>Proposals seeking to establish and operate an energy from waste facility or utilise energy from waste as part of an existing industrial or manufacturing process must comply with strict controls designed to protect human health and the environment.</p> <p>These controls are contained in the Policy as well as in the legislative requirements of the Environmental Planning and Assessment and the Protection of the Environment Operations frameworks that apply to any energy from waste proposal in NSW.</p> <p>Further information about the application and assessment process for energy from waste proposals can be found in the <i>Guide to the NSW Energy from Waste Framework</i>.</p>
2.	<p>Proximity of energy from waste facilities</p> <ul style="list-style-type: none"> Some submissions suggested that minimum distances from residential areas, agriculture and other industries including food processing should be required Some members of the community were strongly opposed to energy from waste facilities being located in or near residential areas 	Community & Local Government	High	<p>The location of an energy from waste facility, like any other industrial activity, particularly any potential impacts on any sensitive receivers such as residential areas, is rigorously considered when a proposal is considered under the NSW planning and assessment process.</p>

Item	Key messages	Stakeholder	Frequency	EPA response
3.	<p>Eligible waste fuels could include hazardous material such as asbestos, tyres, lead, contaminated soil and other toxic materials.</p> <ul style="list-style-type: none"> • How can the quality of input material be controlled? • If hazardous materials do enter the input stream, can the technology safely deal with the contaminants? 	Community	High	<p>Facilities proposing the thermal treatment of hazardous waste materials or contaminated soils are specifically excluded from the scope of the policy.</p> <p>As part of the application and assessment process, proponents of energy from waste facilities are required to demonstrate the suitability of the proposed waste feedstock and the facility's capability to safely and consistently manage any potential variability. Waste streams proposed for energy recovery should not contain contaminants such as batteries, light bulbs or other electrical or hazardous wastes.</p> <p>Eligible waste fuels, outlined in section 3 of the Policy should not be confused with the waste or waste derived materials which may, subject to conditions, be used as feedstock in an energy from waste facility. The list of eligible waste fuels is not a prescriptive or exhaustive list of the waste types that may be used in energy from waste.</p> <p>Eligible waste fuels are a type of waste derived feed stock which, because of their stability, consistency and lack of contamination have been assessed by the EPA as low risk to human health and the environment.</p> <p>All eligible waste fuels are rigorously assessed by the EPA in accordance with the Policy and the Eligible Waste Fuel Guidelines and may only be used as a feedstock for energy from waste where a resource recovery order and exemption has been issued and complied with.</p> <p>Waste feedstock that is not approved by the EPA as an Eligible Waste Fuel must comply with criteria set out in Table 1 of the Policy known as the Resource Recovery Criteria before being able to be used for energy from waste. This feedstock must undergo pre-processing at a genuine resource recovery facility to ensure it is actual residual waste for which there is no viable higher order use and is free from contaminants.</p>

Item	Key messages	Stakeholder	Frequency	EPA response
4.	<p>Waste avoidance & resource recovery</p> <ul style="list-style-type: none"> Some submissions raised concerns that energy from waste may discourage waste avoidance, resource recovery and recycling behaviour more broadly Energy from waste does not fit into a circular economy The EPA should monitor quantities of eligible fuels to support the waste hierarchy 	Community & Local Government	Medium	<p>The Policy is designed to ensure that energy from waste is part of an integrated waste management framework underpinned by the principles of the waste hierarchy.</p> <p>In accordance with the Policy, 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. The policy statement's objectives in setting resource recovery criteria are to:</p> <ul style="list-style-type: none"> 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. <p>The Policy protects and promotes higher order uses of waste by requiring proponents to demonstrate availability and access to feedstock that is genuine residual waste. The Resource recovery criteria in Table 1 of the Policy are the key mechanism for achieving this objective.</p>
5.	<p>There should be stronger social licensing requirements</p> <p>Stakeholders identified the importance of proponents undertaking genuine dialogue and that this should be measurable</p>	Community	Medium	<p>Engaging with the local community and providing timely, accurate and easy to understand information is an important part of the energy from waste application process.</p> <p>The Policy contains the requirement for Public Consultation and the Good Neighbour Principle which sets out these requirements in greater detail.</p> <p>Additionally, the planning process also provides formal avenues for community members to make submissions on any given application.</p>
6.	<p>Energy from waste plays an important role in an integrated waste management framework and within a circular economy, although its role needs to be clarified more broadly</p> <ul style="list-style-type: none"> Energy from waste plays a genuine role in diverting residual waste from landfill Future role needs to be clarified more broadly to provide certainty for investors 	Industry & Government	Medium	<p>The role of energy from waste is a legitimate form of residual waste management in accordance with the waste hierarchy and it provides positive outcomes for communities and the environment.</p>

Item	Key messages	Stakeholder	Frequency	EPA response
7.	<p>The resource recovery criteria are overly restrictive and need to be reviewed</p> <ul style="list-style-type: none"> • 100% of residual waste should be used in energy from waste where food and garden organics are collected • One stakeholder raised concern that a proportion of residual waste will still need to be landfilled even after processing • Recycled products with no market should be an eligible waste fuel 	Industry & Local Government	Medium	The Resource Recovery Criteria set out in Table 1 of the Policy operate to ensure that energy from waste in NSW is consistent with the principles of the waste hierarchy and does not undermine or inhibit current and future higher order uses such as waste avoidance, re-use and recycling.
8.	<p>Pre-sorting/pre-processing requirements</p> <ul style="list-style-type: none"> • Pre-sorting places an unreasonable burden on energy from waste facilities but is not required for landfills • Stakeholders suggested there should be a ban on unprocessed waste going to landfill • Pre-processing requirements for residual waste require clarification 	Organisation, industry & Local Government	Medium	The Policy's intention in setting the Resource Recovery Criteria, which includes the 'pre-processing/pre-sorting' requirement, is to ensure that energy from waste operates in accordance with the principles of the waste hierarchy. A pre-processing requirement ensures that only residual from genuine resource recovery operations are able to be used as feedstock and the risk of contaminants in the feedstock is minimised.
9.	<p>Reference Facility requirements</p> <p>There are challenges with meeting the policy's 'Reference Facility' requirements</p>	Industry	Medium	<p>The Policy's requirement for applicants to be able to point to a Reference Facility is one of a number of measures designed to protect human health and the environment. It achieves this by ensuring that only technologies that are proven, well understood and capable of being able to meet expected variability in feedstock are permitted to operate in NSW.</p> <p>The need to provide a pathway for new and innovative ways of recovering energy from waste without compromising the fundamental objective of protecting human health and the environment has been noted for a number of stakeholders and may be considered as part of any future review of the Policy.</p>

Item	Key messages	Stakeholder	Frequency	EPA response
10.	<p>Clarification is required for whether biosolids and biochar are eligible waste fuels under the policy</p> <p>Industry identified that there are opportunities to use other fuel sources</p>	Government & Industry	Medium	<p>The Policy defines eligible fuels as '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.</p> <p>Biosolids and biochar are not listed as eligible waste fuels in the policy as they can vary between plants and over time.</p> <p>Applications to use biochar in an energy from waste process will continue to be assessed on a case by case basis under the resource recovery orders and exemption process.</p>
11.	<p>The policy should include a detailed list of materials that are not eligible waste fuels</p> <p>The list of toxins is not complete</p>	Community	Medium	<p>Please refer to the responses to items 1. and 3. above in relation to the regulatory and assessment framework and Eligible Waste Fuels. Please also refer to the <i>Guide to the NSW Energy from Waste Framework</i>.</p> <p>It is not practical for the Policy to exhaustively list individual items of waste which can be used as general feedstock for an energy recovery facility. Each applicant is required to demonstrate the source and integrity of their waste feedstock and how it complies with the various requirements in both the Policy and the broader regulatory framework.</p>
12.	<p>Higher order uses of waste oils</p> <p>Concerns raised that waste oils should not be considered an eligible waste fuel as there are higher order usages for the product.</p>	Industry	Medium	<p>Recovered waste oil is listed as an eligible waste fuel under section 3 of the Policy. Item 3 above addresses the issue of eligible waste fuels under the policy.</p> <p>Before obtaining approval to use an eligible waste fuel in an energy from waste process, applicants must satisfy a number of criteria, including but not limited to, demonstrating there are no higher order practical uses for the waste type.</p>

Item	Key messages	Stakeholder	Frequency	EPA response
13.	<p>Other individual comments raised:</p> <ul style="list-style-type: none"> An industry stakeholder was opposed to any proposed levy on energy from waste One local government stakeholder stated there should be additional guidelines for testing methods One industry stakeholder stated the policy should support research into thermal technologies and have a risk-based approach An industry member stated a calculation method for the thermal efficient criteria must be clearly defined in the policy A community member raised other environmental issues more broadly, including plastics, renewable energy and climate change A community member stated public and private funding should be invested in alternatives for waste disposal and energy production, especially in renewable energy An industry stakeholder stated the policy should include greenhouse gas, energy efficiency and life cycle assessments One community member stated the policy is clear and the eligible fuels are reasonable. 	Various	Low	<p>The EPA thanks you for taking the time to provides these comments, suggestions and feedback as part of the consultation process.</p> <p>As noted above, the purpose of this consultation was to seek stakeholder feedback on limited proposed changes to the Policy as recommended by the Chief Scientist and Engineer's report concerning emissions limits and monitoring requirements.</p> <p>Comments, suggestions and feedback on a broad range of issues outside the scope of this consultation have been noted and will be considered as part of any future review of the Policy.</p>

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