Energy from Waste

and your health

Any new proposal for an EfW facility requires an assessment of human health risks or impacts.

Such assessments typically focus on health impacts from the key emissions – air emissions. However, health can also be affected by noise and other aspects such as waste handling and water quality and these will also be considered in most assessments.

An EfW facility also has the potential to offer health benefits through employment (direct and indirect) and any community investment/ support programs that may be implemented by the proponent.



Energy from Waste and your health

How are health impacts from air emissions assessed?

The operation of an EfW facility will result in emissions to air. These are gases and fine particles (that also contain metals and other organic chemicals) that are released to air after passing through pollution reduction or control equipment. The air emissions are released to air via a stack.

The concentrations that are present within the stack must comply with state legislation, the NSW EPA Energy from Waste Policy and licence limit conditions. The concentrations in the stack are not what anyone would be exposed to at any time – they will always be diluted when they exit a stack.



Stack emissions are pushed out at some speed and are typically hotter than atmospheric air. Hence when the emissions rise up and mix with the atmosphere, it spreads/disperses with only a small amount reaching the ground. The concentration that reaches the ground is what people may be exposed to, and this is what has to be evaluated in any assessment of health impacts. These concentrations are much lower than what is in the stack itself (figure from NSW Chief Scientist 2018).



How are health risks assessed?

Risks to health are required to be assessed using Australian guidance as detailed by enHealth (2012) and consistent with NSW Chief Scientist (2020) advice. This requires assessment of exposures to all pollutants from EfW facilities, such as particles, gases, metals and persistent organic pollutants (e.g. dioxins and furans).

The assessment of health risks is required to address inhalation exposures and the deposition of pollutants to the ground and surfaces, and the intake or exposure from accumulation in soil, water (including rainwater tanks and drinking water reservoirs) and produce (including homegrown fruit and vegetables, eggs, milk and livestock).

It is important to note that these chemicals can also be found in our everyday lives through our diet, water, ambient air and consumer products.

The figure (left) illustrates how health risks would be assessed for EfW facilities based on enHealth (2012) guidance.

The health risk assessment would be based on a specific proposal and would use the predicted/modelled air concentrations and deposition rates for all of the relevant chemicals.

Who defines what's an acceptable risk?

Acceptable levels of risk (including carcinogenic risk) are determined based on guidance from enHealth, National Environment Protection Council (NEPC) and state health authorities (i.e. by government authorities). We have a number of different guidelines for chemicals in our environment based on acceptable levels of risk, including drinking water (NHMRC 2021) and contaminated land (NEPC 2013).

What are the health risks from EfW facilities?

The assessment of health risks for EfW has to be specific to each individual facility. This is because the location, size, technology (including pollution control technology) and stack design are unique to each facility. No facility can be approved if a health risk assessment finds unacceptable risks to health.

Should a health risk assessment identify unacceptable risks in initial work, that would trigger a re-engineering of the facility (in terms of pollution control technology and/or stack design) to further reduce emissions to ensure that health risks for a facility will be low and acceptable.

The facilities that have been assessed and approved in Australia have had health risk assessments completed and these have demonstrated that risks to health are low and acceptable

International EfW facilities have also undertaken health risk assessments (using relevant government guidance) as part of the planning process, to demonstrate health risks are low and acceptable. These assessments are completed prior to construction and operation. Internationally, there is approximately 2,000 operational EfW facilities.

Have we assessed health impacts in communities surrounding operational EfW facilities?

Since the 1990s the destruction of waste via incineration (or equivalent) has been undertaken in various countries. Over that time, health impacts from emissions to air have been documented. It is these findings and studies that have resulted in significant improvements in EfW technology.

For newer EfW facilities with modern combustion technologies and pollution control equipment, emissions to air are much lower. In addition, the modern emissions standards, based on best practice technologies (such as the EU Industrial Emissions Directive (IED) emission limits and Best Available Techniques (BREF) West Incineration limits) ensure that emissions to air are appropriately controlled. These standards are regularly reviewed and updated.

A number of epidemiological studies have been undertaken to assess whether there are any health impacts in the communities surrounding operational EfW facilities, that can be attributed to, or more importantly caused by the operation of the facility. Systematic studies have been undertaken to evaluate the epidemiological evidence; these include Cole-Hunter et al 2020, Marner et al 2020, Morgan et al 2019, Tait et al 2020, Parkes et al 2020, Ghosh et al 2019, Freni-Sterrantino et al 2019 and EPA Victoria 2018.

While the number of available studies is limited, these detailed reviews have found no evidence that exposure to emissions from EfW facilities (that are operating in accordance with current EU standards) is associated with adverse health effects in a community

How can the community know that health is protected for the duration of operation for EfW plants?

Any EfW facility that is approved for development would have an Environment Protection Licence that requires ongoing monitoring of emissions from the stack (as a minimum). The licence would also provide upper limits for chemical concentrations in the emissions that cannot be exceeded. These licence limits would be set at a level that would not result in unacceptable risks to the community.

In addition, ambient air quality monitoring can be undertaken to evaluate actual concentrations within the community. The NSW Chief Scientist has indicated that long-term surveillance of ambient air quality, consistent with monitoring required under the National Environment Protection (Ambient Air Quality) Measure is the most useful and appropriate means for assessing potential health impacts.

References

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Woodlawn Advanced Energy Recovery Centre

What has been addressed in the human health risk assessment (HHRA) for this project?

The HHRA for this facility focuses on potential impacts on community health from emissions to air.

This facility is located in New South Wales (NSW), where the Environment Protection Authority (EPA) has developed an EfW policy, under the approval of the Chief Scientist (2020). The policy outlines the maximum concentrations that can be present in emissions from such facilities, which are the same or more stringent than the current EU emissions limits.

Emissions to air from the Advanced Energy Recovery Centre (ARC) have been modelled in the Air Quality Impact Assessment (AQIA) assuming all emissions occur at the maximum emission limits as set out in the NSW EfW policy, as well as the expected emissions (which are lower than the NSW EfW policy maximum emission limits) based on data from a similar plant operating in the UK. AQIA has also included other emission sources in and adjacent to the Eco Precinct, ensuring the assessment has considers total exposure to all emissions, not just the ARC.

The community surrounding the ARC comprises rural residential and residential land where a range of agricultural activities occur. There are also other workplaces, childcare, schools and recreational areas nearby. Many of the residential areas use rainwater tanks for potable/drinking water.

The HHRA is undertaken in accordance with Australian guidelines, as detailed above. The HHRA has taken into consideration feedback from the community and takes a conservative approach to the assessment of potential exposure to emissions from the ARC in the community.

The figure below outlines what is evaluated in the HHRA.



