



Centre for Air pollution, energy and health Research

SUMMARY

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The health impacts of Waste-to-Energy emissions

A systematic review of the literature

The world is in a waste and pollution crisis. We need more efficient use of our resources, from for example, the construction and building industries to the packaging of goods. While no form of energy production is entirely clean, and we cannot avoid waste totally, we can greatly reduce it by considering how to live in a more circular economy. A circular economy attempts to extract the most out of what goes into and out of a process. One example is the 'waste-to-energy' process, which is the use of certain waste as a fuel to create electricity. Note that this is different to incineration. Some parts of the world have been using waste-to-energy processes for decades. For example, Sweden has used waste for fuel since the first half of the 20th century. In 2012 it was estimated that there were about 600 waste-to-energy facilities in operation around the world.

As part of a push towards a circular economy, there has been interest from Australian governments to invest in waste-to-energy facilities. To address potential health impacts of such waste-to-energy facilities, CAR undertook a literature review by searching a digital database of published research ('PubMed') and using specific key words, including "energy", "health", and "waste". We found just under 20 studies which were relevant to our question of "how does Waste-to-Energy processing impact on our health?". We did not search all the literature on incineration, as waste-to-energy facilities are generally engineered differently to traditional incinerators and there is greater emphasis on the type of waste that is used by sorting waste beforehand.

We found few health studies of waste-to-energy processes and of the studies most consisted of health impact assessments or health risk assessments, life-cycle assessments and environmental monitoring studies. Only two studies were epidemiological studies which included direct monitoring of health in humans. Our scan of the literature found that most of the previous research has looked at normal incineration processes involving burning of either

all waste or certain types of waste e.g. compostable waste. Some of that research links pollution from those processes to impacts on the health of our environment or people, although the evidence for effects on people varies from study to study and is not conclusive.

Overall, we found limited research of adverse impacts (or estimated impacts) from well operated and managed waste-to-energy facilities. The research indicated that waste-to-energy if done properly can result in less emissions than normal waste incineration processes or sending waste to landfill, and less emissions than using fossil fuels for energy. We found that the construction sector may benefit most from using waste-to-energy processes to create heat for some of its processes including cement production. For instance, certain solid wastes burn well and can replace fossil fuels such as coal, thereby reducing the need for coal extraction and its associated pollution. Secondly, incorporating by-products of waste-to-energy processing such as the bottom ash, which may otherwise go to landfill, into cement production avoids potentially harmful substances in the ash escaping into the ground and the surrounding water table, and also replaces the need for materials that are used to make cement.

Our review supports the need for appropriate environmental monitoring and health risk assessment in the planning phase and monitoring of emissions and health risks in the operational phase of any new facility. It is important to individually consider each facility given that ultimately, health risks will depend on the density of the surrounding population, the type of waste used and how well it is sorted before processing, the technology used and expected emissions to air and as residual ash, and how well the facility is managed and operated.

The review is currently in under review phase with an international peer-reviewed journal.

Our vision is for a healthier community through cleaner air and cleaner energy sources

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