

Waste to Energy Projects, the Circular Economy, and the Law

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WASTE-TO-ENERGY PROPOSALS

Two proposals for large waste-to-energy plants are under consideration and causing a great deal of debate. They will use the most common waste-to-energy (WTE) technology, disposing of waste by burning it in an incinerator to raise steam in a boiler, to generate electricity or supply heat for industrial processes. They employ elaborate equipment to reduce air pollution. The issues raised by WTE are significant; New Zealand is among the top waste producing nations in the OECD (3.2 tonnes of waste per capita per annum), and the worst for reuse and recycling: NZ Infrastructure Commission, *Rautaki Hanganga o Aotearoa 2022-2052 New Zealand Infrastructure Strategy* (2022) at 98. At the same time air pollution from combustion of different kinds already has significant adverse health impacts: Gerda Kuschel and others, *Health and Air Pollution in New Zealand 2016* (2022); Stats NZ, “Health Impacts of Exposure to Human-Made Air Pollution” (2023). It seems useful to ask whether the current legal and policy framework for WTE projects is satisfactory.

For the first of the two projects, in 2021 Global Contracting Solutions Ltd applied for resource consents for a WTE plant in Te Awamutu. (See the Environmental Protection Authority’s advice and recommendations of 9 August 2023 and 11 April 2024 on RMA call-ins: <https://www.epa.govt.nz/public-consultations/in-progress/>.) It would take about 166,500 tonnes of waste a year, municipal solid waste 45-50%, plastic 20%, tyres 20%, and car flock 10%. (This is equivalent to about half of the class 1 landfill waste disposed of in the Waikato Region in 2020.) About one-sixth of the waste would be recycled and the rest incinerated. The flue treatment process would screen and trap pollutants, and the plant would produce ash, metals and other miscellaneous recyclable material. The greenhouse gas emissions may be 145-165 kilotonnes a year of CO₂-e, which is significant; the plastics in the waste stream increase the emissions.

For the second project, in 2022 South Island Resource Recovery Ltd applied for consents for a plant at Glenavy, in Waimate District Council, north of the Waitaki River, which it dubs Project Kea. It would take

about 360,000 tonnes of waste a year, about half of it household waste and half construction and demolition waste. This is on a large scale; seventy truckloads a day, and equal to about 20% of the South Island’s existing waste stream that is currently sent to landfill. The exhaust system would screen and trap 20,000 tonnes of fly ash a year, and there would also be 80,000 tonnes of bottom or grate ash to be disposed of. The estimated cost of the project is \$350 million, and its proponents are China Tianying Inc (which specializes in WTE) as to 60%, and a New Zealand company Renew Energy Ltd as to 40%. Overseas Investment Act approval was obtained in March 2024. The project has been called in for an Environment Court hearing.

INTERNATIONAL EXPERIENCE

Although WTE is novel in New Zealand, there is considerable experience with it internationally, and it is useful to consider law and policy in Europe and Australia. In Europe, it became widespread in the 1990s, under policies that sought to reduce landfilling. The WTE installations were able to meet strict emission standards. The EU Landfill Directive 1999/31/EC of 26 April 1999 required a phase-out of the landfilling of biodegradable municipal waste, to avoid methane emissions. At this time, coal was used for much of Europe’s power generation, compared to which WTE looked good. Especially in northern countries, WTE provided district heating, bringing warm water to houses and other buildings. (New Zealand has no such schemes.) However there were costs as well as benefits: a Dutch study showed that the total social cost of incineration was almost twice that of landfill: Elbert Dijkgraaf and Herman Vollebergh, “Burn or Bury? A Social Cost Comparison of Final Waste Disposal Methods” (2004) 50 *Ecological Economics* 233. From the 2000s, the use of coal dropped in many countries, so that WTE could no longer be considered to be low-carbon energy. At the same time, far more effort was put into reducing the amount of waste going to final disposal, by diverting paper, plastics, wood and organic waste – all energy-rich and therefore desirable for WTE – out of the waste stream. In 2015 the European Union adopted an ambitious circular economy plan, in which

WTE was accepted as playing a role where waste cannot be prevented or recycled, but subject to the principles of the waste hierarchy: European Commission, “Closing the Loop - An EU Action Plan for the Circular Economy” COM/2015/0614 final. The revised legislation on waste set clear targets for recycling, reduction of landfill, and extended producer responsibility: Directive 2018/851 amending Directive 2008/98/EC on Waste.

The concept of the circular economy is of more than European significance. It envisages an economy where materials, once they have been grown or extracted from the earth, are used and reused for as long as possible, with minimal waste or no waste at all. Under it, the waste hierarchy is a policy approach that identifies the best-to-worst options for waste. The best is to reduce the amount of resources we require, rethinking our processes and redesigning our products. Second is reuse, repair, and repurposing of products, to keep them in use for as long as possible. Third, if there must be disposal of some kind, is to recycle, compost and reprocess. Fourth, we recover value, if possible, such as with renewable energy; and finally, for truly residual waste, we send it to final disposal. The circular economy concept is guiding policy for waste, environment, and climate change in many countries. New Zealand’s free trade agreements with the EU and the United Kingdom adopt it, and it has been endorsed in the *New Zealand Emissions Reduction Plan* (Ministry for the Environment, 2022) at 297 and the *Infrastructure Strategy*. The waste hierarchy features in the Waste Minimisation Act 2008 s 44 in guiding the waste plans that territorial authorities must make.

In 2017 the EU updated its policy on WTE; it must support the circular economy, and not detract from it, and it must be firmly guided by the principles of the waste hierarchy: European Commission, “The Role of Waste-to-Energy in the Circular Economy” COM(2017) 34 final. The policy draws careful distinctions between different kinds of WTE, some of which are desirable, such as anaerobic digestion, incineration with high levels of energy recovery, and co-incineration in cement and lime production. Policy measures intend to reduce the amount of energy-rich material (plastics, wood, paper, and biodegradables) in the waste stream, which would constrain WTE. There was considerable concern with WTE overcapacity, because several countries have too many WTE plants operating. Denmark no longer generates enough waste to power its 23 WTE plants, so it is importing waste from Germany and the UK. It intends to cut its incineration capacity by 30% over the next ten years, and remove 80% of the plastic waste going to incineration. Contractual obligations to provide waste fuel for the operational lifetime of plants can discourage efforts in waste prevention, re-use and recycling. The EU’s position therefore is that new projects require very close scrutiny, and that Member States should phase out public support for the recovery of energy from mixed waste. In 2020, as one of the main elements of the “Green

Deal” the EU announced new plans to ramp up recycling and halve the amount of residual municipal waste by 2030: European Commission, “A New Circular Economy Action Plan” COM2020(98) final. WTE is not being favoured.

A valuable European lesson for New Zealand is to take care with what contracts are made to feed WTE plants. WTE companies have commonly required municipalities to commit to deliver set volumes of waste or pay compensation; they are locked in. This goes directly against waste reduction efforts of all kinds. Belgrade, for example, entered into a 25-year contract to deliver two-thirds of its municipal waste to a WTE contractor, without prior sorting, which probably prevents it from meeting EU recycling targets. In other cities and countries, public ownership has allowed WTE to be reduced without contractual constraints. New Zealand municipalities should not be able to make long-term waste contracts which would thwart important public policy objectives.

Closer to home, in Australia there is only one WTE project approaching completion, after years of disputes and delays, in Western Australia. The law and policymaking has been at the state level, and clearly the state governments have been working together. In the last five or ten years, the governments have revised their general waste strategies, fully endorsing the principles of the waste hierarchy and the circular economy. Then in 2020 and 2021 they made policy or position statements that elaborated how WTE (or “energy from waste”) fits under those strategies. The policies generally have a formal statutory basis, in a regulatory context where a waste facility requires approval above and beyond land use and air quality permits. Policies leave the door open for WTE as a means of disposal of residual waste, but they are emphatic that WTE must not undermine policy and actions for waste reduction, reuse, recycling, and enhanced material recovery, and they must not undermine efforts to reach waste strategy targets. What waste may be used for WTE is tightly controlled; excluded are unprocessed waste streams that have not gone through a systematic audited material resource recovery process; and so is unprocessed municipal solid waste. Waste stream composition and air pollution controls are to be closely monitored. However, the policies encourage WTE where it is clearly beneficial. Several policies require that a proposal has obtained a degree of community acceptance.

The legal framework in Victoria is particularly interesting as a model for New Zealand. First came a policy statement for waste, stating the general principles for a circular economy and waste hierarchy and including new strategies for recycling, landfill levies and container deposits: Department of Environment, Land, Water and Planning, *Recycling Victoria: A New Economy* (2020). The Circular Economy (Waste Reduction and Recycling) Act 2021 (Vic) was enacted to implement it. It was

followed by the Victorian Waste to Energy Framework (Department of Environment, Land, Water and Planning, 2021), the objective of which was “to encourage investment that supports diversion of residual waste from landfill, while avoiding risks to recycling outcomes in the future.” Over-investment that could detract from waste minimization was a special concern. The main policy response was a cap limit of one million tonnes a year of waste that could go to WTE in the state, until 2040. The Act was amended to this effect and new WTE regulations were made. The legislation requires a facility to obtain a waste to energy licence, it defines what is permitted waste for WTE purposes, and it distinguishes between the various thermal waste disposal processes. It is important to consider whether New Zealand has a satisfactory legal framework for WTE without such provisions.

WASTE MINIMISATION ACT

For New Zealand, the Waste Minimisation Act 2008 is the first port of call. It has an interesting history but for many years failed to live up to its potential: Hannah Blumhardt, “Trashing Waste: Unlocking the Wasted Potential of New Zealand’s Waste Minimisation Act” (2018) 14 Policy Quarterly 13. It provides for product stewardship schemes (such as for tyres), the waste levy, the responsibilities and powers of territorial authorities, a Waste Advisory Board, and regulation-making powers. But it does not require waste facilities of any kind to be licensed.

The main relevant policy document is the Ministry for the Environment’s *Waste Strategy / Te rautaki para* (2023), which is grounded in circular economy and waste hierarchy principles, and which sets three reduction targets for 2030: waste generation (the amount entering the waste management system), 10 per cent per person; waste final disposal (at the other end of the system), 30 per cent per person; and biogenic emissions from waste, 30 per cent. It sets an accompanying series of goals for different timeframes. The *Strategy* addresses WTE but only in general terms. It recognizes the merit of recovering value as preferable before the final permanent disposal of materials, including WTE. Goal 6 is “We look for ways to recover any remaining value from residual waste, sustainably and without increasing emissions, before final disposal.” A balanced and consistent approach is suggested, neither wholly for nor wholly against WTE.

The *Strategy* observes that some forms of energy recovery are already seen in New Zealand, such as where forestry waste is used at sawmills to heat drying kilns. Such clean renewable biomass as a feedstock is better than burning natural gas or coal, and is likely to align with circular economy goals. Timber offcuts as a single-material waste stream are also desirable. So too are chipped vehicle tyres, which are now being used to displace coal to fire a cement kiln at the Golden Bay

cement works near Whangarei. Similarly, anaerobic digestion can take food waste and produce a certain amount of usable biogas while eliminating large uncontrolled methane emissions; the technology is well-established, and a large plant recently opened at Reporoa is now taking large quantities of food waste from city sources.

However, the *Waste Strategy* identifies the technical difficulties of using mixed and non-biological waste like municipal solid waste, which are more likely to create hazardous by-products and produce greenhouse gas emissions, and the facilities for which require large long-term flows of material that may be threatened by policy efforts to reduce, reuse and recycle waste, especially plastics. The broad assessment (p 46) is:

Pyrolysis, incineration or gasification of municipal solid waste is unlikely to align with our circular economy goals, due to their negative effects on the climate, dependency on continued linear waste generation, and likelihood of causing hazardous discharge.

This conclusion seems sound, but its status in the *Waste Strategy* is curious. The reference to “incineration” was included by amending the Strategy four months after it was initially published. (See Ministry for the Environment, “In July 2023 page 46 of *Te rautaki para* was updated to specifically include incineration alongside pyrolysis and gasification.” <https://environment.govt.nz/publications/te-rautaki-para-waste-strategy/> viewed 21 May 2024. The first version of the Strategy was published on 29 March 2023.)

Looking to see what the Act says about the *Strategy*, one finds that territorial authorities, when they are making their waste management and minimisation plans, must have regard to the New Zealand Waste Strategy or any government policy that replaces it (section 44); and the government may require a territorial authority to change its plan if the change will assist in achieving the Strategy (section 48). But the Act does not actually provide for the making of that Strategy; it does not define it, direct the Minister or anyone else to make it, or lay down the process for making or amending it. It is a policy instrument identified in an Act, with legal consequences, but not actually made under the Act. Does this affect the weight to be given to the *Strategy*? It could be argued that the informality with which it can be changed reduces its significance; and it could be said that it is not a strategy prepared under another Act for Resource Management Act plan and policy making purposes: ss 61(2), 66(2), and 74(2). On the other hand it is clearly the official document required by the Waste Minimisation Act, made after consultation, with Cabinet approval, and intended to state policy at the national level.

As for the general import of the *Strategy*, we see clearly that the concerns with WTE it identifies are consistent with those in EU and Australian policies. New Zealand is committed to efforts to reduce, reuse, recycle

and recover waste, and to keep products and materials in useful service for as long as possible, and it is essential to prevent those efforts being disrupted by WTE. WTE needs supplies of waste that are large, long-term, and committed for the life of the plant; which is contrary to efforts to reduce the size of the waste stream and remove easily burned materials like plastics. The WTE feedstock must stay large enough to run the plant, while in contrast landfills have no difficulty in gradually reducing their intake.

Indeed, the control of the supply of waste as a fuel is a key dimension of WTE policy. We have noted the ‘lock-in’ problem where a municipality makes a long-term contract to send its waste to WTE, perhaps restricting its ability to sort and divert wood, plastics and organics out of the waste stream, and with only limited power to make changes to accommodate in central or local government policy. The political dimension of such a contract is very real: Nick Robertson and Merewyn Groom, *Waste to Energy: the Incineration Option* (BERL, 2019) at 35. As for the legal dimension, the Waste Minimisation Act s 52 imposes some restrictions: a territorial authority contracting for any waste management and minimisation activity must do so in accordance with its waste management and minimisation plan; the making of that plan must (as we have noted) have regard to the *New Zealand Waste Strategy*; and the government can order the authority to amend its plan to achieve or assist the Strategy. The government can also make such an order if the plan is inadequate to promote effective and efficient waste management and minimisation. Thus there is some opportunity to ensure that local councils are not too easily persuaded to enter into contracts that could thwart circularity policies. Also applicable are the special consultative procedure and the requirements for making decisions under the Local Government Act 2002 ss 76AA-83.

For all that, one must ask whether the direction in the current *Strategy*, and the legal tools, are strong enough to address WTE effectively. Both the Infrastructure Commission (in its 2022 *Strategy* noted above) and the Climate Change Commission (*Advice on the Direction of Policy for the Government’s Second Emissions Reduction Plan*, 2023 at 333) have called for a clear WTE policy, and greater clarity seems very desirable.

WASTE LEVY

The most effective policy tool under the Waste Minimisation Act is the waste levy that landfills must pay, but, surprisingly, WTE plants will not have to pay it as the Act stands at present. Disposal, on which the levy is imposed, is defined to include the incineration of waste, which means “the deliberate burning of waste to destroy it, but not to recover energy from it”: sections 6 and 26. This exclusion has been there right from when the Act was a private member’s bill; it may have been intended to

avoid penalizing the beneficial forms of WTE that we have noted.

The two policy purposes of the waste levy are spelled out in section 3(2) of the Act. The first is to raise revenue to fund waste minimisation and related activities. Levies of this kind are common as a targeted way of raising funds for particular purposes. The range of activities has been extended by an amendment that came into force on 1 July 2024; the revenue may now be used for managing emergency waste, remediating contaminated sites, and making general environmental improvements. The Act directs that half the revenue is distributed to territorial authorities. The second policy purpose of the levy that section 3 states is to increase the cost of waste disposal, to recognise that disposal imposes costs on the environment, society, and economy. It is an environmental charge imposed to reduce harm that an activity causes outside the market system, obliging a firm to take in the negative externalities that it produces.

The levy initially applied only to landfills accepting household waste and at the low level of \$10 per tonne, but it has been expanded and increased: from 1 July 2024 the levy rates per tonne for different facilities are \$60 for municipal (household) disposal, \$30 for construction and demolition fill, and \$10 for managed or controlled fill: Waste Minimisation (Calculation and Payment of Waste Disposal Levy) Regulations 2009. Further increases are set under the Waste Minimisation Amendment Act 2024. Yet even with these increases, the levy rates are lower than in many comparable jurisdictions: Eunomia Research & Consulting Ltd, *Waste to Energy Technology Implications in the Aotearoa New Zealand Context* (2023) prepared for Waikato Regional Council and Tauranga City Council, available as Waikato Regional Council Technical Report 2023/TR23-27, at 25.

Why should the waste levy apply to waste if it is taken to a landfill but not if it is taken to a WTE facility? The levy is not imposed because there is anything special about landfilling as an activity; landfills have site-specific environmental issues, addressed under the RMA, but so to WTE plants. The levy is imposed as to waste and the challenges that it poses. There is no rationale for distinguishing WTE and giving it a lighter load, and there appears never to have been a deliberate policy choice to do so. The exclusion is serious because it gives WTE a financial benefit for no good reason, allowing WTE to offer lower prices for disposal than its landfill competitors who must charge their customers an extra \$60 per tonne. Policy levers should not distort market competition, especially to favour a challenging technology. The disparity is an anomaly that should be rectified.

In removing the anomaly two complications need to be addressed. The first is that there is a case for exempting ash from a WTE operation from the waste levy if the levy has already been paid on the feedstock taken in; it does not seem that the levy should be paid twice. The second is to avoid imposing the levy on operations that are

plainly beneficial but could be caught by an overly broad definition of WTE. The solution seems to be to lay down a basic rule that WTE is subject to the levy, as a means of final disposal, but with exclusions or exceptions for the main classes of desirable operations, and a power for either regulations or ministerial orders to except others, provided that the environmental benefits clearly outweigh the costs. (Existing powers in sections 29 and 41 for exceptional circumstances would not be sufficiently targeted.) The legislation in Victoria provides a good guide.

On the adverse effects of the exclusion, government policy analysis came to the same view, concluding that the blanket exclusion of WTE is inequitable and may create an unintentional incentive for harmful waste practices, without distinguishing between desirable and undesirable technologies: Ministry for the Environment, *Regulatory Impact Statement: Proposals to Support a Transformation in Waste Management in New Zealand* (2023), at 54.

RESOURCE MANAGEMENT ACT

The main regulatory approvals that WTE proposals require are resource consents under the RMA, and the most significant are permits for the discharge of a contaminant from industrial or trade premises to air. Both the current proposals have been referred to the Minister for the Environment for a call-in, for them to be decided centrally as proposals of national significance, under section 142, and in both cases the Environmental Protection Authority has recommended a call-in, having regard in particular to the preferences of Māori interests. The Minister has directed that the Waimate case be referred to the Environment Court, but has not yet decided on the Te Awamutu case. For that case, the EPA recommended a board of inquiry rather than the Environment Court, to accommodate the Treaty of Waitangi aspects and the desire of the Waikato River Authority to nominate a board member in exercise of its rights under the Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010.

For the air discharges, the decision-makers will give close consideration to regional policy statements and regional plans, and to national policy statements and national environmental standards, even though these instruments are unlikely to say anything specific about WTE activities. The plans and standards may classify the discharges as discretionary activities, with no presumption for or against allowing the discharge. National Standards for Air Quality are sure to be relevant, for example, in the tight rules they lay down against the discharge of particulate matter if it is likely to affect a polluted airshed: Resource Management (National Environmental Standards for Air Quality) Regulations 2004 reg 17. The Waimate plant would be located near two such airsheds. For the Te Awamutu proposal as a

whole (not only air quality) the decision-makers must consider Te Ture Whaimana, the vision and strategy for the Waikato River: Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010 ss 9-20.

Decision-makers on a call-in must have regard to greenhouse gas (GHG) emissions, and GHGs are likely to loom large in their deliberations. There was a bar to considering GHGs between 2004 and 2022, but it was removed when s 104E was repealed by the Resource Management Amendment Act 2020. For a board or the Court on a call-in, the removal occurred on 1 July 2020; otherwise the effective date was 30 November 2022. Both the current WTE applications were made before that date.

The RMA decision-makers can also consider Waste Minimisation Act matters, as they did in a recent landfill case, *Te Rūnanga o Ngāti Whātua v Auckland Council* [2023] NZEnvC 277. The *New Zealand Waste Strategy* is sure to be relevant. The fact that the *Strategy* is not actually made in the exercise of a statutory power is unlikely to be determinative because it is plainly an official government policy, but the fact that it can be amended informally, and has been so amended in relation to WTE, is likely to be raised. The Waimate applicant noted that its proposal is for incineration and not pyrolysis or gasification, and was therefore aligned with the *Strategy*, so it is sure to have an opinion on the addition of incineration to the list of processes unlikely to align with circular economy goals.

Some of the strengths and weaknesses of the RMA will be on display in WTE proceedings. The Act provides a high level of integration in resource management, thorough assessment of effects on the environment, and public testing of assessments and evidence – which will all be invaluable. But the Act often operates in a reactive manner, especially where, as here, RMA policy-making has not provided clear strategic guidance against which to evaluate a particular proposal. The result is that decision-making is chiefly focussed on the effects of the project on the environment. That focus has its good side; the RMA was deliberately designed to concentrate on environmental matters, and not try to evaluate financial viability or social, economic or regional development concerns: *NZ Rail Ltd v Marlborough District Council* [1994] NZRMA 70 (HC). But the bad side is when it fails to look forward and plan to achieve positive environmental outcomes. These strengths and weaknesses are well understood now: Greg Severinsen and Raewyn Peart, *Reform of the Resource Management System: the Next Generation Synthesis Report and Next Steps* (Environmental Defence Society, 2019); *New Directions for Resource Management in New Zealand: Report of the Resource Management Review Panel* (Tony Randerson, Chair: Ministry for the Environment, 2020). RMA decision-makers will be reluctant to make broad policy decisions on the place of WTE in New Zealand.

Landfill cases show that the RMA does not generally require an exhaustive evaluation of alternative methods or

locations for a proposal, and, once the need for a landfill is made out, it does not require a detailed analysis of the volumes of waste that will be generated in the region and how they will be disposed of: *Ngāti Whātua*, above, and *Transwaste Canterbury Ltd v Canterbury Regional Council* (EnvC C29/2004, 22 March 2004). On the other hand, those cases show an acceptance of the concept of the waste hierarchy, and the place of landfill at the lowest end of it (*Ngāti Whātua*, above), and a readiness to impose conditions on the consent holder to require local bodies using the landfill to certify that they have waste plans in place that include reduction, reuse, recycling, recovery, and treatment, and that the waste meets the plan's requirements: *Transwaste*, above.

Compliance, monitoring and enforcement (CME) are likely to be a challenge. CME has often been inadequate under the RMA; there have often been difficulties with expense and expertise for compliance and monitoring, but there has also often been a reluctance to take enforcement action in situations where it is necessary: *New Directions*, above, at 391. Better CME tools are also needed in the Act. WTE projects will be highly complex, above all in their pollution control equipment. It will take a great deal of training, resourcing and backup to keep this equipment running properly, and if it is not running properly, the whole time, then significant pollution is likely to occur. Starting up, closing down, adjusting the operation, dealing with equipment failures, and dealing with variations in the feedstock all present the risk of a sudden spike in emissions. Even the monitoring systems that gather data on emissions parameters will be complex and subject to the risk of operational failures. The RMA track record raises a concern that a regional council will be too willing to overlook or forgive pollution events at a WTE facility. Much will depend on sophisticated consent conditions to provide a foundation for strong and proportionate CME.

CLIMATE CHANGE AND ENERGY ISSUES

A WTE facility burning waste to generate electricity or industrial heat will be subject to the New Zealand Emissions Trading Scheme (unless it is only using solid biofuel), and as a participant in the stationary energy sector the operator must surrender units for its GHG emissions: Climate Change Response Act 2002 ss 54 and 63, Schedule 3, Part 3. (The definition of waste in s 4 excludes any solid biofuel combusted for the purposes of generating electricity or industrial heat.) The Regulations provide four different methods for calculating the total annual emissions, and an operator can apply for a unique emissions factor to be approved if it can find a mode of calculation that is better for it: Climate Change (Stationary Energy and Industrial Processes) Regulations 2009, regs 21-26C; and s 91 of the Act. The future of prices in the NZETS is hard to predict, but the government has said that they are to be the main driver of

climate change mitigation, which they can do only if they are at significant levels.

The Climate Change Commission has recommended a precautionary approach to WTE, to allow research to inform policy, which would have to be consistent with the Waste Strategy and promote the objectives central to reducing the emissions from waste in the Emissions Reduction Plan: *Advice on the Direction of Policy for the Government's Second Emissions Reduction Plan* (2023) at 333.

Whether WTE reduces GHG emissions is a central question. The main study to date, by Eunomia Research (2023, above, at 4) concludes that with a typical composition of waste, WTE technologies can be expected to perform worse than landfill. (The authors warn that they do not model actual emissions from real facilities.) Much depends on the composition of the waste stream; if it is low in organic material and high in plastics and rubber, then WTE will have higher carbon emissions, but if it is high in organic material, then its emissions will be lower. GHG emission results are always improved if food waste is sent to anaerobic digestion and composting. Similarly, good results come from using clean single-material waste streams like wood and tyres for WTE co-processing. Modern landfills with effective methane gas capture are generally to be preferred for genuinely residual mixed waste, and WTE for mixed waste and fossil-based materials should be avoided unless there is strong evidence that fossil-fuel use will be directly offset and circularity policies will not be impeded.

As for the energy benefits, they are only modest; the 15 MW proposed electricity generation capacity for Te Awamutu, and the 30 MW for Glenavy, are small compared to, say, the 132 MW of the Wairakei geothermal power station. WTE would not be subject to the seasonal fluctuations that hydro experiences, but it would probably not be capable of ramping up to meet peak electricity demand. It would not displace fossil fuels, which generate only about 15-20% of our electricity, and which are decreasing in their share; virtually all new generation projects proposed or under construction are for wind, solar, and geothermal.

LAW AND POLICY QUESTIONS

What this brief review shows us is that there are three main issues in law and policy for WTE. The first is that WTE should not undermine the generally-accepted long-term policy of reducing the amount of waste we generate and increasing the amount of reuse, recycling and recovery. The waste hierarchy and circular economy principles must prevail. It is therefore obvious that the waste levy should apply to WTE unless excepted where the environmental benefits clearly outweigh the costs. The exclusion of WTE from the levy is a policy anomaly that has adverse policy effects, and is easily remedied; Australian examples show how it can be done. The

Australian comparison also shows us that the Waste Minimisation Act needs strengthening, notably as to the making of the *Waste Strategy*, the *Strategy's* legal effect, the powers of local bodies, and the planning and licensing of major facilities.

Secondly, WTE will stretch the RMA. The RMA can be expected to provide good scrutiny of adverse effects on the environment, but resource consent hearings are not a satisfactory procedure in which to work out a national policy on something like WTE. National direction is plainly desirable, and call-ins will ensure that climate change implications are properly considered. Otherwise, the main issue will be conditions relating to the performance of air pollution control equipment and monitoring systems. RMA regulation is often weak in compliance, monitoring and enforcement, so consent conditions will need to support effective regulatory action where necessary, and regional councils will need to put resources into protecting air quality. Air pollution is a

largely hidden adverse effect but it is deadly. All told, the need to update or replace the RMA is very clear.

Finally, the climate change consequences of WTE projects must be evaluated carefully, taking into account waste reduction and recycling actions, the composition of the permitted waste stream, and the performance of WTE as a means of final disposal in comparison with modern landfills equipped with methane capture systems.

WTE shows that there are gaps in our environmental law and our efforts to move to a low-carbon economy using circularity principles. Some of the gaps are important but are easily remedied. At the same time, the technology seems to face headwinds in demonstrating that it is good for New Zealand when many other countries are restricting it. It may be paradoxical to say that landfilling waste is a good thing; it is not, not as good as reducing waste, but it may often be better than burning it.