Waste Management

SUBMISSIONS OF WASTE MANAGEMENT NZ LIMITED TO THE NEW ZEALAND PRODUCTIVITY COMMISSION ON LOW-EMISSIONS ECONOMY

1. INTRODUCTION

1.1 Waste Management (**WM**) supports the overall aim of the Low-emissions economy draft report (**Report**) to transition New Zealand towards a sustainable future and a low carbon economy through the use of innovation, support of investment, supportive regulations and policies.

1.2 New Zealand has the fastest rate of population growth amongst the OECD countries we generally measure ourselves against. Stats NZ has produced population projections ranging from low to high, depending on different rates of fertility, mortality and migration. The medium projection - considered to be the most plausible - is for the population to be 5.5 million by 2038. With this growth, NZ will see a greater demand on all types of transport and electricity and will inevitably see an increase in volumes of waste. New Zealand must take account of this and balance the impact of population growth with its international GHG commitments.

1.3 WM has the third largest trucking fleet in New Zealand and is the largest operator of landfills in New Zealand. WM is also the largest renewable energy generator in Auckland and the largest renewable energy from waste generator in New Zealand.

2. TRANSPORT

2.1 WM agrees with section 8.2 of the Report which states that the reduction of long-life gases must be a priority. Transport is New Zealand's second largest source of GHG emissions contributing to 20% of gross emissions and about a third of long lived gas emissions. Carbon dioxide released from transport is a long lived gas with a stated "up to millennia" lifetime. Fugitive methane from landfills is a short lived gas with a stated atmospheric life of 12 years. Therefore WM submits that efforts should be prioritized to reduce transport emissions which have a long life over reducing landfill emissions which have a short life. In addition landfill gasses produce renewable energy as more particularly discussed under the headings "Electricity" and "Waste" later in this submission.

2.2 Transport emissions rose 70% from 1990 to 2015. Mostly from light vehicles (75%), with heavy vehicles contributing 25%.

2.3 WM supports any priority given to reduce NZ transport emissions, including the introduction of emissions standards on light and heavy vehicles entering New Zealand.

2.4 WM agrees that electric vehicles are one of the best mitigation opportunities, however, while this remains a developing technology and while there remains uncertainty around battery life and availability of vehicles, NZ should avoid committing to a date to phase out importing fossil-fuel vehicles.

2.5 The current incentive of exempting EV's from road user charges until 2020 is well supported, but given the high upfront costs of introducing EV's into a sizeable fleet, WM suggests that this period of RUC exemption should be increased to provide greater certainty to vehicle owners.

2.6 WM supports the introduction of a Feebate system whereby vehicles not meeting an emissions standard would incur a fee and vehicles performing better than a set emissions standard would receive a rebate. This rebate could possibly be in the form of a RUC discount for diesel vehicles and a similar rebate for petrol vehicles. Such a system would provide a continuous incentive to purchase low or zero emission vehicles and should apply to both light and heavy fleet.

2.7 WM supports the concept of moving freight from road to electrified rail as it would provide a good opportunity to reduce emissions. However, the NZ rail network and rail services are not well enough developed to take full advantage of this. In addition, pricing of rail freight does not offer sufficient incentive for users to change from road to rail.

2.8 WM accepts the statement that current transport investment is biased towards investment in roads. However, care should be taken not to reverse this bias at the expense of developing an efficient and safe road network. NZ is not well suited to public transport and retrofitting is difficult and expensive. As NZ moves towards EV's, the need for efficient roading networks will remain and the need to improve road safety through roading improvements should not be diluted by the desire to reduce emissions.

3. ELECTRICITY (section 12 of the Report)

3.1 WM acknowledges that 85% of NZ's electricity is from renewable resources but at the same time notes that the sources of renewable energy such as hydro and wind are not able to meet the demand that exists now or in the future. The distribution of energy to the point of demand remains an issue.

3.2 WM believes that there should be greater recognition and acknowledgment of renewable energy (electricity and heat) produced at modern landfills. WM owns or part owns and operates Redvale and Whitford Landfills in Auckland, Tirohia Landfill in the Waikato and Kate Valley Landfill in Canterbury. These landfills capture landfill gas and generate 20MW of renewable electricity directly into the national grid. As at December 2018, this will be 24MW which is sufficient to power 24,000 homes. In addition, there is the ability to utilise heat off the generators to supply local needs such as the greenhouse complex neighbouring Redvale.

3.3 Given the concerns about supply and distribution of electricity as we move to adopting more EVs, landfills become increasingly more important as the providers of a 24/7 base load Distributed Energy, injecting renewable energy into the grid close to the point of demand. This resource at landfills offers greater security of supply than wind and hydro, which are affected by climatic uncertainty (dry years or seasons of settled or variable weather). Being closer to the point of demand, it also reduces the strain on the national grid.

3.4 The proposed diversion of organics from landfill will reduce the ability of landfills to provide this valuable renewable energy resource. Further explanation of this is set out in the section below headed "Waste".

3.5 Question 12.1 in the Report asks whether decision making under the RMA unduly constrains investment in renewable electricity generation and whether the National Policy Statement for Renewable Energy Generation 2011 (REG) could be strengthened to give clearer direction to regional, district and unitary councils to make provision for renewable energy generation in their regional and district plans, regional policy statements and resource management decisions.

3.6 WM believes Local government could and should give greater recognition of the opportunities and benefits of renewable energy generated at landfills. Modern, sustainable, Class 1 landfills are identified as being of critical importance to the functioning and growth of a region and a key component of a region's infrastructure. The process to consent such significant infrastructure is understandably time consuming and expensive, however, during this process the focus is on avoiding GHG emissions and offensive discharges to air. Other than the landfill owner's own initiatives, there is no incentive or requirement to utilise the landfill gas as a renewable resource. This is unlike the UK, where feed-in tariffs for low emissions electricity generation exist which have incentivised methane capture and utilisation from landfills.

3.7 In fact, the converse applies in NZ. Local government will generally aim to divert organic waste from the landfill (because it produces methane) without recognizing the larger carbon footprint created by the energy demands of diversion (see the section headed "Waste" below).

4. WASTE

4.1 It is easy to reference various waste related reports and draw inaccurate conclusions about the management of emissions in the NZ Waste Sector. In our submission below, we will attempt to clarify some misconceptions.

Methane

4.2 Methane is not a GHG unless it is released into the atmosphere. Methane is considered a resource and is used to generate renewable energy (electricity and heat). Landfills produce methane, but at a Class 1 landfill more than 90% of this is captured and converted to renewable energy. The remaining methane is mostly oxidised as it passes through the landfill cap (ie is no longer methane) with a small percentage escaping to the atmosphere as a GHG (most likely less than 5%).

Reducing emissions from landfills

4.3 The Report states emissions reductions from solid waste relies on reducing organic waste to landfill in the first place which is then followed by better management of methane once waste reaches landfill. WM considers it best to deal with this statement as two separate issues.

4.4 Reducing the production of organic waste (ie before it is created) should be the priority rather than diverting organic waste from landfill. Diverting organics from landfill reduces emissions

from Landfill itself by virtue of the low waste volume, but this only applies when considering landfill emissions in isolation of any other activity. One must consider the full carbon footprint of diverting that organic waste, from start to finish. Once organic waste is produced, care must be taken not to cause greater transport emissions while diverting this from landfill "just for the sake of diverting waste from landfill" and so as to reduce emissions "from landfill".

4.5 The separation of foodwaste from other waste for separate residential collection and treatment will increase transport related emissions. Transport already comprises 44.8% of NZ emissions. By WM's calculations for Auckland alone, this would entail an additional 500,000km per annum of travel by collection vehicles. Furthermore, the additional handling, screening, and processing of this waste stream will consume additional energy, potentially fossil fuels. By our calculations this will amount to approximately doubling the emissions per tonne than if the foodwaste continued to go to landfill.

4.6 The diversion of foodwaste from landfill does not offer the anticipated reduction in emissions. In fact it increases them.

4.7 When considering the management or methane once it is produced, WM agrees that better methane management does not require new technology. The emissions can, and are, effectively avoided by existing technologies.

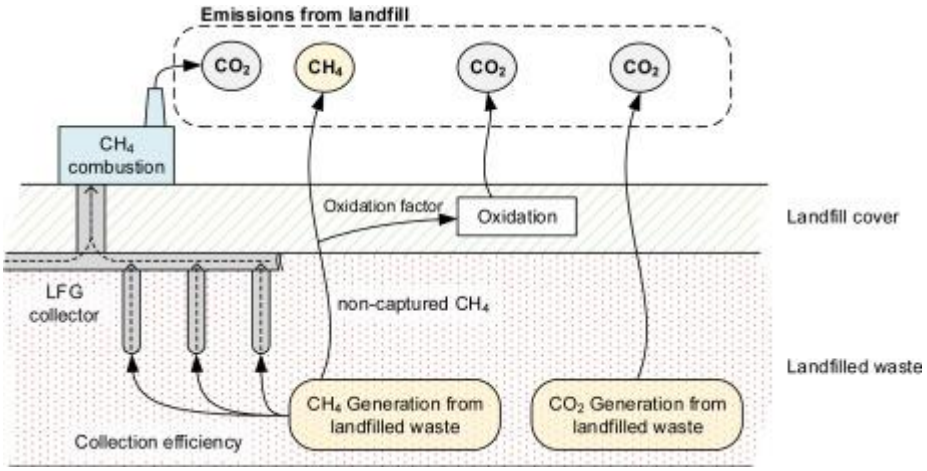
Emissions from Class 1 landfills are overstated.

4.8 WM submits that the GHG emissions from landfills are overstated.

4.9 NZ EPA interpretation of the ETS assumes that 10% of the methane produced at a landfill is oxidised through the cap (oxidation of methane (CH_4) means methane is converted to carbon dioxide (CO_2) and water (H_20) ie no methane present). EPA then makes a further assumption that a maximum of 90% of the remaining gas is capable of being extracted by the landfill operator. Combined, these assumptions equate to a maximum capture of 81% of the methane produced. WM confirms that the 10% oxidation is a fairly common assumption, albeit not universally accepted, however there is no basis for the further assumption that only 90% of the gas is collected.

4.10 Waste Not Consulting suggests that 20-90% of landfill generated methane is recovered. This infers, and is incorrectly misunderstood by many who attempt to calculate GHG emissions (including the NZ ETS), that the remaining 10% is methane with a global warming potential of 25 times that of CO_2.

4.11 The figure below represents the fate of CH4 generated from waste decomposition, and is expressed as the sum of four emission components: (1) CO_2 emissions from collected CH_4 combustion, (2) non-collected CH_4 emissions, (3) CO_2 emissions from oxidized CH_4 in the landfill cover, and (4) CO_2 emissions from waste decomposition.



4.12 It is only the CH_4 emissions included in category 2 that are GHG emissions which should be included in the NZ ETS.

4.13 The ETS provides an incentive for landfill operators to improve their landfill gas capture by placing a price on fugitive emissions. It is effectively a formula that is agreed by which the government taxes emissions but because of assumptions within that formula, it does not necessarily measure the actual emissions from landfills.

4.14 GHG inventories incorrectly assume that the maximum amount of methane that can be captured is 90% and that the remaining 10% is released to atmosphere as a GHG.

4.15 Redvale, Whitford and Kate Valley landfills all recover greater than 90% of the methane gas that they produce. WM is of the view that less than 5% of the methane produced at a well operated Class 1 landfill is released to atmosphere as a GHG.

4.16 I quote also the evidence of Martin Evans (CPENG, CM EngNZ) on the draft Auckland Council Waste Management Plan 2018 as follows:

"I note that in Waste Management's submission methane recovery I stated as 90%. My experience over 20 years of observations and testing is that the remaining 10% methane is NOT discharged to atmosphere but is biologically treated within the intermediate and final capping so that there is virtually zero methane discharge to the atmosphere from modern run landfills".

4.17 In summary, emissions from managed landfills can most effectively be improved by enforcing the NES and potentially amending the NZ ETS to recognise that oxidisation of methane through the cap (being the layer of soil that is placed daily over the waste) eliminates methane from fugitive gas.

Potential negative impact of the ETS

4.18 The ETS is essentially a means by which landfills are taxed on their GHG emissions, and is set up supposedly to incentivise landfill operators to maximise their methane recovery. However, WM asserts that this financial tool does not reflect actual GHG emissions and should not be used to calculate a carbon footprint.

4.19 Furthermore, the ETS can act as a disincentive to Class 1 Landfills maximising the capture of methane, which can result in increased NZ emissions from waste.

4.20 The ETS assumes a 10% oxidation factor, and then limits the potential capture and destruction of the remaining "unoxidised" methane to 90%. Other than following selective precedents from other countries, there are no obvious or sound reasons for these limitations, which effectively limit a landfill operator's ability to capture methane to 81% (90% x 90% = 81%).

4.21 Through measurement of captured methane using calibrated equipment and audited processes, WM has demonstrated at its landfills that it is possible to capture well in excess of 90% of the methane produced (98% at Redvale).

4.22 By limiting the capture rates, the ETS results overstate landfill emissions by understating the methane capture and assuming the balance is emitted as a GHG emission. In addition, by not giving landfill operators recognition for the higher capture rate there is a danger that landfills could reduce their efforts, which would result in less methane capture and higher fugitive GHG emissions.

Emissions pricing

4.23 The Report suggests that neither the ETS levy nor the waste disposal levy currently operate at a level that is sufficient to incentivize emissions reductions or the reduction in organic waste to landfill. The Report suggests that a more effective emissions price under the NZ ETS will help to reduce emissions from managed sites. WM does not agree with this for the following reasons:

(a) 2/3 of the emissions from waste are from unmanaged sites, which are not currently included in the NZ ETS. Including these sites in the NZ ETS would have a greater benefit than increasing the emissions price on those facilities that already have the ability to capture 90% of their emissions.

(b) Given that most of the major landfills capture greater than 90% of their methane, there is little opportunity to reduce emissions further from these sites by increasing the price.

4.24 The Report then states that only an effective emissions price can encourage the adoption of better methane reduction and capture technologies at landfill sites. Reference is made to emissions still occurring from closed landfills and suggesting that local government may attempt to introduce post disposal emissions management.

4.25 WM asserts that the NZ ETS already accounts for methane from closed landfills by making the assumption that all landfill gas (methane) produced by waste is emitted in the year that the waste is placed in the landfill. Clearly this is theoretical as waste will decompose over an extended period of up to approximately 35 years, depending on the organic compound. For

practical purposes the ETS had to make this assumption because a Landfill operator would not be able to claim ETS costs from customers on an annual basis 35 years after the waste was disposed. What this means however, is that the landfill operator is paying the tax on emissions in advance of the emissions occurring (ie for the remaining operating life of the landfill and after the landfills is closed).

4.26 Local authorities also have the ability to require closed landfills to continue to extract and destroy landfill gas during the post closure period.

4.27 With these two means of mitigation in place, there is no need to introduce any post disposal emissions costs and the landfill operator will have already paid the full liability in advance.

4.28 When the ETS was introduced landfill operators participating under the NZ ETS were allowed to surrender carbon units from overseas markets. These units were priced at less than $1 per unit. There was also a surrender subsidy of 1 unit for 2 tonnes of CO2e. With this in place, there was little incentive for some landfill operators to install best practice landfill gas management systems unless, like WM, they valued the methane as a renewable resource for generation.

4.29 Over time, as the use of overseas units has ceased and the 1 for 2 subsidy is removed, the market for carbon has developed and the price has increased to approximately $22 per tonne of CO2e. This means that the cost of emissions has increased by a factor of approximately 44, from approx. $0.50 per tonne of CO2e released to $22 per tonne of CO2e released.

4.30 The latest available information on the effectiveness of the ETS is the MfE's report dated June 2017. This does not account for the impact that the recent increase in ETS charges has had on emissions. That data will not be available until mid- 2019 at the earliest. WM submits that this will then need to be analysed before the effectiveness of the removal of the subsidy on emissions is known. Only at that point should any possible changes to the ETS be considered.

Waste Data

4.31 WM supports the statement that the current level of data available around sources of solid waste emissions indicates that priority action must be to reduce emissions from unmanaged solid waste sites.

4.32 This will require extending the waste disposal levy and NZ ETS to all unmanaged, yet known and consented facilities that are used for the disposal of solid waste, and changing consenting processes, bylaw processes or both to cover any remaining disposal sites (such as farm dumps).

4.33 There are 381 known consented sites that fall under the category of unmanaged sites (being sites that do not have controlled placement of waste, and do not have at least one of the following: cover material, mechanical compacting or levelling of waste).

4.34 WM suggests that it is highly likely that these unmanaged sites are consented in some form or other but excluded from levy and ETS because they do not receive household collection waste, or they are farm dumps, with very little waste (including organics). It is therefore quite

possible that these sites produce less methane from a given amount of waste than managed landfills, because a larger fraction of waste decomposes aerobically in the top layers of an unmanaged facility.

4.35 If, as stated in the 2014 GHG emissions inventory, a substantial number of small unmanaged sites (known as farm dumps), were estimated to be responsible for 42% of total emissions from solid waste, the solution would be to simply require them by way of consent to operate to a certain standard that reduces their emissions or include them in the ETS in some form or other.

Legislation

4.36 Section 14.2 of the Report references the policy framework for waste and emissions in NZ as comprising several pieces of legislation which sit beneath the Waste Strategy. Particularly relevant pieces of legislation are listed as:

(a) Waste Minimisation Act 2008 (WMA) which focuses on reducing waste volumes

(b) The Resource Management Act 1991 and Local Got Act 2002 which regulate waste disposal and management via consenting and bylaw processes

(c) Climate Change Response Act 2002 (CCRA) which, via the Climate Change Response (Emissions Trading) Amendment Act (2008) requires waste disposal operators to participate in the NZ ETS.

4.37 The Report states that the RMA provides two main avenues for reducing emissions from waste. Firstly by regulating waste disposed at managed facilities by way of contaminants to air and secondly by way of local governments to determine whether waste disposal sites require consents.

4.38 WM notices that the Report has failed to acknowledge other existing legislation, namely the National Environmental Standards for Air Quality (Air Quality NES), which are regulations made under the Resource Management Act 1991 that aim to set a guaranteed minimum level of health protection for all New Zealanders.

4.39 Clauses 25, 26 and 27 of the Air Quality NES specifically state that landfills currently accepting waste with a capacity of greater than 1M tonnes and with 200,000 tonnes of waste already in place may not allow the discharge of gas to air from a landfill unless the landfill has a landfill gas management system designed and operated to ensure the discharge of methane from the surface of the landfill does not exceed 5000 ppm and the gas is flared or used for generation.

4.40 WM is of the view that the emissions from landfills would be greatly reduced if this regulation was enforced on a national scale.

4.41 The Report references comment by D Wilson et al, 2017 that while the levy will have some effect on emissions, the different aims of the levy and the ETS mean that it is not possible to rely solely on the levy to reduce emissions. He suggests that a differentiated levy for organic waste could achieve more effective emissions reduction.

4.42 WM challenges this view as it is not appropriate. As stated in the Report, the levy is intended to reduce waste volumes to landfill. It is not aimed at reducing emissions from waste. The

ETS is aimed at reducing emissions by way of incentivising landfill operators to improve gas management practices. It would not be appropriate to double tax emissions by increasing the waste levy to target organics to landfill for the specific purpose of reducing emissions. Further to this, as already stated, the diversion of organics (foodwaste) from landfill is likely to result in greater emissions due to the energy consumed in the transport and processing of that product, without the same benefit of generating renewable energy (electricity and heat).

Comparison to International Trends

4.43 This part of the Report is misleading in part. It references the European Landfill Directive as requiring landfills to capture landfill gas and if possible, use the landfill gas to produce energy (Council of European Union 1999). The Report fails to reference to the NZ Air Quality NES, which requires the capture and destruction of landfill gas. Unfortunately this is not policed by MfE. In relation to the beneficial use of landfill gas to produce energy, many private landfill operators are already doing this with WM having commenced the capture of landfill gas and the production of renewable energy in the year 2000.

4.44 Figure 14.6 of the Report shows "Landfill tax rates for Municipal Solid Waste In New Zealand and Comparator countries". NZ tax is shown as $10 per tonne. This is the waste levy and not the ETS charge. Current ETS charges equate to approx. $26 per tonne of refuse. Adding the $10/tonne waste levy, the tax on waste to landfill is currently approx. $36/tonne (unless a landfill reduces its emissions). NZ should expand the waste levy and ETS to all disposal facilities (including unmanaged landfills and farm dumps) if we want to reduce the amount of waste. There would be little justification to increase ETS costs if landfills are already capturing 90% of the GHG and the remaining 10% is oxidized. It would simply be a punitive revenue generating tax burden that achieves no beneficial outcome.

4.45 The Reports sates that in the UK, feed-in tariffs for low emissions electricity generation have incentivised methane capture from landfills. WM supports this initiative in NZ.

4.46 The Report states that NZ has a substantial policy deficit regarding emissions and waste and has made little progress in reducing emissions. WM challenges this statement. As stated above, the ETS is flawed in that landfills are limited to a theoretical UEF of 90% and there is an assumption that the remaining 10% is methane. Because of this, landfills already capturing 90% can never show an improvement. In addition, as already explained, the 10% is not methane, but CO2 and H20, meaning the fugitive methane emissions are exaggerated and are distorting the NZ GHG inventory.

4.47 The Report summarises opportunities for reducing emissions in NZ in Fig 14.8.

(a) Managed Sites – NZ ETS emissions pricing. WM does not agree for reasons already stated. Local Govt consents should require gas management at operating and closed sites.

(b) Unmanaged Sites: apply waste disposal levy – WM agrees, although believes this will have the effect of reducing waste, but with limited impact on emissions.

(c) Farm Dumps – introducing consent and bylaw processes under the RMA and WMA. WM supports this. Farm dumps should also be introduced into a scaled down version of the Levy and ETS legislation

(d) Better waste data for Managed, unmanaged and farm dumps. WM disagrees that this will assist with Managed sites but supports its introduction for Unmanaged sites as it might assist with preventing organic wastes entering cleanfills etc (illegal waste practices)

(e) Waste to Energy options for NZ. WM has a view that these are not viable will tend to act against waste reduction and recycling as these are expensive facilities which rely on maximising waste in order to provide a good return.

(f) Reducing waste at source – the greatest opportunity for both waste volumes to landfill as well as emissions. Reducing waste at source (such as reducing packaging) reduces transport and energy emissions related to recycling and recovery.

5 SUMMARY OF WM'S RECOMMENDATIONS

5.1 In relation to the Transport Sector, WM:

(a) supports the reduction of long-life gases as a priority

(b) supports any priority given to reduce NZ transport emissions

(c) supports the introduction of vehicle emissions standards

(d) supports incentivising the uptake of electric vehicles

(e) supports the introduction of a Feebate system

(f) recommends extending the period of RUC exemption on electric trucks

(g) recommends avoiding the reduction of investment in roads to the extent that it will compromise improving road safety

(h) recommends avoiding any commitment to a date to phase out importing fossil-fuel vehicles

5.2 In relation to the Electricity Sector, WM:

Recommends a greater recognition and acknowledgment of renewable energy (electricity and heat) produced at modern landfills as the providers of a 24/7 base load Distributed Energy

5.3 In relation to the Waste Sector, WM:

(a) Submits that whilst the ETS is used as a financial tool to incentivise landfill operators to maximise their methane recovery, it does not reflect actual GHG emissions and therefore it should not be used to calculate a carbon footprint.

(b) Submits that the ETS may act as a disincentive to Class 1 Landfills to maximise the capture of methane by limiting the theoretical capture rate to a level below the actual achievable rate, which may result in an increase in NZ emissions from waste.

(c) Recommends careful consideration of the full carbon footprint of diverting organic waste from landfills as this might increase emissions

(d) Is of the view that emissions from landfills are overstated under the ETS, thereby distorting the NZ GHG inventory around Class 1 landfills

(e) Is against the introduction of emissions costs on closed landfills

(f) Disagrees with the view that a more effective emissions price under the NZ ETS will help to reduce emissions from managed sites

(g) Is of the view that the NZ ETS pricing is effective, and recommends deferring any changes to the NZ ETS until the full effect of removing the 1:2 subsidy on emissions from landfills is known

(h) Disagrees with the view that the Waste Levy should be used to reduce emissions from landfills

(i) supports the view that more data is required from unmanaged solid waste sites to reduce emissions from these sites

(j) Recommends greater enforcement of the the National Environmental Standards for Air Quality (Air Quality NES) to further reduce emissions from disposal sites

(k) Recommends greater regulation around unmanaged sites and farm dumps

(l) Recommends reducing waste at source, which will have the greatest impact on reducing emissions from landfills

(m) Disagrees with the statement that NZ has a substantial policy deficit regarding emissions and waste and has made little progress in reducing emissions. Emissions from the majority of Class 1 landfills have been well managed since before the NZ ETS. Greater enforcement of existing consents and the National Environmental Standards for Air Quality (Air Quality NES) will further reduce emissions from disposal sites

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