

MEMORANDUM

Malaysia Must Move Towards Zero Waste: The Case Against Waste-to-Energy Incineration

submitted by



Consumers' Association of Penang



& Sahabat Alam Malaysia

to

**Prime Minister of Malaysia
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Ministry of Energy Transition and Water Transformation
Ministry of Finance
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Tenaga Nasional Berhad**

August 2024

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MEMORANDUM
Malaysia Must Move Towards Zero Waste:
The Case Against Waste-to-Energy Incineration

EXECUTIVE SUMMARY

Southeast Asia is a fast growing region, experiencing rapid urbanization and population growth. This rapid growth increases the challenge of waste management, particularly the overwhelming accumulation of plastic waste. Among the proposed solutions by some entities are waste-to-energy (WTE) incinerators, which are aggressively marketed as a comprehensive solution to the waste crisis.

Proponents of WTE facilities claim that incinerating waste not only eliminates the waste but also generates energy, thus providing a dual benefit. In Malaysia, the Ministry of Housing and Local Government (KPKT) has identified 18 locations for the development of WTE plants throughout the country by 2040.

This memorandum highlights the disadvantages associated with WTE incinerators, drawing on research and global case studies. We underscore the environmental, economic, and health impacts of WTE facilities which has not been taken into serious consideration by the Malaysian government. We further advocate for zero-waste strategies.

In summary, the disadvantages of WTE incineration are:

- 1. Waste Is Not A Renewable Fuel:** Municipal waste is non-renewable, consisting of finite resources like paper, plastic, and glass. Incinerators burn valuable materials that could be recycled or composted, competing with reuse and refilling programmes.
- 2. Diverts Investments From Real Solutions:** Over 90% of materials incinerated can be reused, recycled, or composted. Incineration discourages resource conservation, releases toxic chemicals, and misallocates funds from zero-waste solutions.
- 3. Consumes More Energy Than Produced:** WTE incinerators convert less than 25% of the energy in waste to electricity, making them inefficient and costly. They require significant investment, negatively impacting local economies without contributing substantially to the energy grid.
- 4. Toxic Emissions And Health Risks:** WTE incinerators release thousands of pollutants, including cancer-causing dioxins and furans, mercury, and particulate matter, posing significant health risks and environmental contamination.
- 5. Climate Change Contribution:** WTE incinerators emit greenhouse gas emissions, disrupt the natural carbon cycle and exacerbate climate change by promoting unsustainable waste disposal practices.

6. Job Loss: Incinerators provide fewer jobs compared to other waste management options such as composting and recycling. They take away employment opportunities from informal waste workers and recyclers.

7. Incompatibility With Circular Economy: Incinerators are fundamentally incompatible with a sustainable circular economy. They transform waste into hazardous ash, increasing toxicity and waste disposal issues, rather than eliminating waste.

Several recommendations and alternatives can be carried out to address the increasing challenge of waste management instead of relying on WTE incinerators:

1. Zero Waste Approach: The Zero Waste approach has been proven effective in ensuring resource efficiency, resource recovery, and protection of scarce resources. The goal is to end waste disposal. The plan encompasses waste reduction, composting, recycling, reuse, changes in consumption habits, and industrial redesign.

2. Promote Composting Initiatives: Composting organic waste like food scraps and garden waste is an alternative to incineration. This practice reduces landfill waste of up to 50%, lowers hauling costs, and decreases carbon emissions.

3. Enhance Waste Collection and Sorting Infrastructure: Upgrading waste collection and sorting infrastructure is essential to improve recycling efficiency. Advanced sorting technologies can increase recovery rates and reduce contamination, while better-designed recycling bins and more frequent pickups can enhance resident participation.

4. Support Circular Economy: Encouraging circular economy practices such as reducing, reusing, repairing, and recycling products can extend their lifecycle, conserve resources, and minimise waste generation. Involving local businesses in circular economy networks fosters resource sharing and collaboration, promoting a more sustainable local economy.

5. Mandatory Extended Producer Responsibility (EPR): Making EPR programmes mandatory holds manufacturers accountable for product lifecycle management, encouraging designs for easy and safe recycling, and reducing environmental impact.

6. Implement E-waste Collection and Recycling Programmes: Establishing a dedicated e-waste collection and recycling programme is crucial for managing discarded electronic devices and reducing environmental impact.

7. Deposit-Refund System: A deposit-refund system can be implemented to promote recycling and reduce environmental pollution. Malaysia can also introduce RVMs for beverage containers to boost recycling. The RVMs can offer convenient deposit return systems and incentives, such as refunds or coupons, to encourage public participation.

8. Reuse And Refill: Implement reuse and refill programmes by encouraging the public to bring their own bottles and food containers for take away food. Install convenient refill stations at public areas and retail stores, making it easier for people to adopt sustainable practices in their daily lives.

1.0 INTRODUCTION

The Housing and Local Government Ministry (KPKT) has announced plans to establish 18 waste-to-energy (WTE) plants by 2040. KPKT Minister had told the Dewan Rakyat in July 2024 that the WTE plants can generate up to 600 megawatts of renewable energy, aiming to achieve the targeted 70 per cent renewable energy capacity and reduce carbon emissions by 45 per cent, as outlined in the National Energy Transition Roadmap 2050.¹

The widely used WTE concept is advertised for its effectiveness in reducing solid waste by up to 85%, minimising the need for large disposal sites, and eliminating leachate, odours, and methane emissions associated with traditional landfills. Despite these purported benefits, it is imperative to critically examine the broader implications of adopting WTE incineration, as will be detailed in this memorandum.

1.1 Definition Of Waste-To-Energy And Incinerators

The phrase "Waste-To-Energy" (WTE) refers to a variety of technologies that convert non-recyclable waste into fuels, power and heat that can be used. WTE is frequently used to refer specifically to incineration which burns completely combusted waste at ultra-high temperatures allowing for energy recovery.²

Incinerators, also known as mass burn incinerators, thermal treatment facilities, or WTE plants, are designed to treat waste by burning them. This process can involve various technologies, including combustion, pyrolysis, gasification, and plasma arc. Despite their technological differences, the common goal of these processes is to reduce the volume of waste through thermal treatment, theoretically transforming it into energy and reducing landfill use. However, this process generates toxic by-products that are often challenging to manage.

2.0 DISADVANTAGES OF WASTE-TO-ENERGY INCINERATORS

2.1 Waste Is Not A Renewable Fuel

Renewable energy (RE) is defined as energy created from natural processes that do not deplete, such as wind, wave, or solar. In contrast, municipal waste is non-renewable, consisting of discarded materials such as paper, plastic, and glass derived from finite natural resources like forests being cut down at unsustainable rates. Thus, WTE incinerators do not qualify as renewable energy sources since they rely on non-renewable municipal waste. In effect, incinerators burn many valuable resources. It competes for the same materials as recycling programmes, undermining efforts to conserve resources and reduce waste.

Key legislation and financial institutions in the European Union (EU) are moving away from supporting incineration. The Renewable Energy Directive was revised in 2018 to clarify that

¹ Naz, H. 2024, July. Govt to set up 18 Waste-to-Energy plants by 2040, says Nga. New Straits Times. <https://www.nst.com.my/news/nation/2024/07/1070781/govt-set-18-waste-energy-plants-2040-says-nga>

² Student Energy. 2023. Waste to Energy. <https://studentenergy.org/conversion/waste-to-energy/>

mixed waste is not considered a renewable energy source. Subsidies for WTE incineration are only provided if waste is properly sorted to encourage more sustainable practices.³

Additionally, the EU's Sustainable Finance - Taxonomy Report, published in 2019, excluded WTE incineration from the list of economic activities considered sustainable for investment purposes. Excluding WTE incineration signals a shift towards prioritising recycling and other waste management strategies that have a lower environmental impact.⁴

Moreover, the European Investment Bank (EIB) also supports this shift. In its 2019 Circular Economy Guide, the EIB excludes incineration as a contributor to the circular economy as it does not align with the circular economy model, which focuses on recycling, reusing, and repairing materials instead of destroying them.⁵

These decisions show that waste incineration is not a sustainable practice. By excluding WTE incineration from key policies and funding, the EU is promoting more eco-friendly ways to manage waste and produce energy.

2.2 Diverts Investments From Real Solutions

More than 90% of the materials that are currently incinerated or landfilled can be reused, recycled, or composted.⁶ Incineration releases toxic chemicals and creates a demand for waste similar to how coal-fired power plants require coal. Burning these materials to generate electricity creates a demand for waste, discouraging efforts to conserve resources, reduce packaging and waste, and encourage composting and clean, safe recycling.

Moreover, waste incineration reduces incentives for waste prevention and minimisation, which are top priorities in waste management. Incinerators, which are costly to construct and operate, compete with zero-waste approaches and divert taxpayer funds from these real and effective solutions.

Countries and regions in the EU with high waste incineration rates, such as Denmark, typically have lower recycling rates and generate higher per capita waste. In 2020, Denmark generated around 5 million tonnes of municipal waste, averaging 845kg per person, which is much higher than the estimated EU average of 505kg per person. Waste management was split between recycling (53.9%) and incineration (45.2%), with less than 1% going to landfills.⁷

³ Official Journal of the European Union. 2018, December 21. Directive (EU) 2018/2001 Of The European Parliament And Of The Council Of 11 December 2018 On The Promotion Of The Use Of Energy From Renewable Sources. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.328.01.0082.01.ENG&toc=OJ:L:2018:328:TOC

⁴ EU Technical Expert Group On Sustainable Finance. 2019. Taxonomy Technical Report. https://finance.ec.europa.eu/system/files/2019-06/190618-sustainable-finance-teg-report-taxonomy_en.pdf

⁵ European Investment Bank. 2020, May. The EIB Circular Economy Guide. https://www.eib.org/attachments/thematic/circular_economy_guide_en.pdf

⁶ Platt, Brenda et al. 2008. Stop Trashing the Climate, ILSR, Eco-Cycle & GAIA.

⁷ European Environment Agency. 2022, June. Early warning assessment related to the 2025 targets for municipal waste and packaging waste (Denmark). <https://www.eea.europa.eu/publications/many-eu-member-states/denmark/view>

Incinerator companies are misleadingly marketing WTE incineration as renewable energy. The misallocation of funds hinders progress toward a sustainable energy future and exacerbates climate change by promoting practices that generate more greenhouse gases. WTE incineration is not only non-renewable but also diverts investments from renewable energy solutions like wind and solar, which are essential to prevent the worst impacts of climate change.

2.3 Consumes More Energy Than Produced

Waste incineration is the most expensive⁸ and least efficient way to generate energy. Due to the low calorific value of waste, the incinerators convert less than 25%⁹ of material energy in the garbage into marketed electricity.

Despite low energy production, incinerators are capital-intensive. Investing over \$150 million to \$230 million¹⁰ in large, modern facilities would be lucrative for the incinerator companies, but not for the nearby communities or the local government. The waste incineration industry has the highest negative economic impacts¹¹ from air pollution compared to the financial value added by the industry.

Additionally, the energy produced by WTE incinerators is marginal and will not significantly contribute to the electricity grid. Since the waste composition in Malaysia is about 40 to 50% organic, incinerators would need additional energy input to first process the waste to make it suitable for burning, and then burn it, negatively affecting the energy balance of these facilities.

In contrast, Zero Waste practices such as recycling and composting conserve three to five times the energy produced by waste incineration.¹²

⁸ U.S. Energy Information Administration. 2013. Updated Capital Cost Estimates for Utility Scale Electricity Generating Plants. https://www.eia.gov/outlooks/capitalcost/pdf/updated_capcost.pdf

⁹ The Wall Street Journal. 2015, November 16. Does Burning Garbage for Electricity Make Sense? <https://www.wsj.com/articles/does-burning-garbage-for-electricity-make-sense-1447643515>

¹⁰ Seltenrich, N. 2013, August 28. Incineration Versus Recycling: In Europe, A Debate Over Trash. https://e360.yale.edu/features/incineration_versus_recycling_in_europe_a_debate_over_trash

¹¹ Muller, N. Z., Mendelsohn, R., & Nordhaus, W. 2011, August. Environmental Accounting for Pollution in the United States Economy. *The American Economic Review*, 101(5), 1649–1675. <https://doi.org/10.1257/aer.101.5.1649>

¹² Morris, Jeffrey. 2005, July. Comparative LCAs for Curbside Recycling Versus Either Landfilling or Incineration with Energy Recovery, *The International Journal of Life Cycle Assessment*. <http://www.springerlink.com/content/m423181w2hh036n4/>

2.4 Toxic Emissions And Health Risks

All incinerators pose considerable risks to the health and environment of neighbouring communities and the general population. Even the most advanced incinerators release thousands of pollutants that contaminate air, soil, and water, entering the food supply and concentrating up the food chain. They are major emitters of cancer-causing dioxins and furans, significantly increasing the risk of cancer in nearby areas.¹³ Studies show a significant increase in the risk of dying from cancer in areas near incinerators. Communities around incinerators are highly vulnerable.

Incinerator emissions are also a source of particulate matter - tiny particles of dust that can lead to decreased lung function, irregular heartbeat, heart attacks, and premature death. A public health impact report states that modern incinerators in the EU are a major source of ultra-fine particulate emissions.¹⁴ In 2017, another study revealed that particulate matter contributed to over 4 million premature deaths globally in 2015.¹⁵ China and India were identified as the nations most affected by health effects and death from the said pollution.

Emissions of mercury (a known neurotoxin) are also a major concern. Aside from toxic air emissions, incineration technologies produce highly toxic by-products. Pollutants captured by air filtering devices are transferred to the facility's by-products, such as fly ash, bottom ash, boiler ash/ slag, and wastewater treatment sludge that are then released into the environment.¹⁶

The US regulatory agencies have found that incinerators are prone to various types of malfunctions, system failures and breakdowns, which routinely lead to serious air pollution control problems and increased emissions that are dangerous to public health.¹⁷

Newer waste incinerator technologies are claimed to run more cleanly and with less environmental impact. Nevertheless, pollutants are still produced, with upgraded facilities requiring regular service to maintain emission levels. There is some suggestion that newer incinerator technologies with robust maintenance schedules may be less harmful, but diseases from exposures tend to manifest only after many years of cumulative exposure, so it is premature to conclude that these newer technologies improve safety.¹⁸

¹³ Waste Incineration and Public Health (2000), Committee on Health Effects of Waste Incineration, Board on Environmental Studies and Toxicology, Commission on Life Sciences, National Research Council, National Academy Press, pp. 6-7.

¹⁴ Howard, C. Vyvyan, Statement of Evidence, Particulate Emissions and Health, Proposed Ringaskiddy Waste-to-Energy Facility, June 2009

¹⁵ Health Effects Institute. 2017. State of Global Air 2017. Special Report. Boston, MA:Health Effects Institute. https://www.stateofglobalair.org/sites/default/files/SoGA2017_report.pdf.

¹⁶ Römbke, J., et al. 2009. Ecotoxicological characterisation of 12 incineration ashes using 6 laboratory tests.

¹⁷ Massachusetts Department of Environment citations for violations by Covanta Haverhill Incinerator: http://www.cjcw.com/notice/Covanta_Massachusetts_environmental_violations.pdf

¹⁸ Peter W. Tait, James Brew, Angelina Che, Adam Costanzo, Andrew Danyluk, Meg Davis, Ahmed Khalaf, Kathryn McMahon, Alastair Watson, Kirsten Rowcliff, Devin Bowles. The health impacts of waste incineration: a systematic review, Australian and New Zealand Journal of Public Health, Volume 44, Issue 1, 2020, Pages 40-48, ISSN 1326-0200. <https://doi.org/10.1111/1753-6405.12939>.

The modern Chotikov WTE in the Czech Republic, built in 2019, passed periodic dioxin testing, which gave the false impression of safety. However, just 16 months into operation, biomonitoring studies revealed that 89% of total 90 eggs analysed within a 5-kilometer radius exceeded the European dioxin limit.¹⁹

Similarly, the state-of-the-art Kaunas WTE in Lithuania, which commenced operation in 2020, also passed periodic dioxin testing. Yet, within only 4 to 5 months, biomonitoring studies showed that 83% of eggs analysed from six locations within a 3-kilometer radius surpassed the European dioxin limit.²⁰

In another case, the advanced Beringen WTE in Belgium, featuring a stoker design with multiple air pollution control devices, was built in 2020. Biomonitoring tests commissioned by the City Council in 2019 and conducted during operation in 2021 and 2022 revealed that dioxin concentrations increased significantly. By 2021, 50% of eggs analysed exceeded the European dioxin limit.²¹ The location close to the incinerator shows the highest increase of nearly all dioxins and furan congeners.

These examples illustrate a troubling pattern: despite the latest technology and passing periodic dioxin tests, modern WTE incinerators are still associated with elevated dioxin levels in biomonitoring studies.

2.5 Climate Change Contribution

WTE incinerators emit more carbon dioxide per megawatt-hour than traditional fossil fuel power plants. Incinerating materials such as wood, paper, yard debris, and food discards is far from “climate neutral”; rather, incinerating these and other materials is detrimental to the climate.²² According to the US Environmental Protection Agency (EPA), WTE incinerators and landfills contribute far higher levels of greenhouse gas emissions and overall energy throughout their life cycles than source reduction, reuse and recycling of the same materials.²³

Incineration also drives a climate-changing cycle of new resources pulled out of the earth, processed in factories, shipped around the world, and then wasted in incinerators and landfills.

Denmark, the poster child of Europe’s incinerator industry, recently discovered that its incinerators were releasing twice the amount of carbon dioxide than what they originally estimated, and had probably been doing so for years. This caused Denmark to miss its Kyoto

¹⁹ A. Arkenbout & K. Bouman. (2021). The True Toxic Toll: Biomonitoring research results in Pilsen, Czech Republic 2021. Zero Waste Europe. https://zerowasteurope.eu/wp-content/uploads/2022/01/Toxic-Toll-Biomonitoring-report_Czech-Republic.pdf

²⁰ A. Arkenbout & K. Bouman. (2021). The True Toxic Toll: Biomonitoring research results in Kaunas, Lithuania 2021. Zero Waste Europe. https://zerowasteurope.eu/wp-content/uploads/2022/01/Toxic-Toll-Biomonitoring_Lithuania.pdf

²¹ Toxic Watch. 2022, May 11. Biomonitoring research Beringen, Belgium, 2019-2021. <https://www.toxicowatch.org/single-post/biomonitoring-beringen-belgium-2021>

²² Platt, Brenda et al. 2008. Stop Trashing the Climate.

²³ U.S. EPA. 2006. Solid Waste Management and Greenhouse Gases, A Life-Cycle Assessment of Emissions and Sinks 3rd edition.

Protocol greenhouse gas reduction targets.²⁴ In contrast, a 2009 study by the US EPA concluded that up to 42% of US greenhouse gas emissions could be mitigated through Zero Waste strategies such as recycling and composting.²⁵

2.6 Job Loss

Incinerators require huge capital investments but offer relatively few jobs compared to recycling. There are also no green jobs in WTE incineration, and they take away jobs from people who need them most. In the US, recycling typically creates 10-20 times more jobs than incinerators.

In developing countries, incinerators will take jobs away from informal waste workers including waste pickers, recyclers and haulers. The materials burned in incinerators are often the same materials that sustain recycling such as paper and plastics. Recycling is the livelihood of millions of waste workers worldwide, and burning recyclables means robbing waste workers of their source of income. In contrast, investment in recycling, reuse and composting will create more jobs²⁶ and can enable informal workers to transition to these green jobs.

2.7 Incompatible With Circular Economy²⁷

From the broader perspective of sustainability, incinerators are a losing proposition and are fundamentally incompatible with a closed-loop and circular economy. They are essentially destroyers of discarded products and materials, and concentrators of toxicity.

Incinerators exacerbate waste disposal problems because they do not eliminate waste. Instead, they produce large quantities of hazardous ash (amounting to as much as 30% of the total waste burned²⁸), which must then be disposed. By reducing the volume but increasing the toxicity of waste, incineration merely replaces one waste stream with another. Incinerator ash is highly toxic and has no useful purpose. Therefore, it is a complete loss to the system.

²⁴ Buley, Jennifer. 2011, April 14. Plastic Surgery for Copenhagen's Recycling Policy. <http://www.no-burn.org/plastic-surgery-forcopenhagens-recycling-policy>.

²⁵ U.S. EPA. 2009. Opportunities to Reduce Greenhouse Gas Emissions through Materials and Land Management Practices.

²⁶ Institute for Local Self-Reliance. 1997. Recycling means business. <http://www.ilsr.org/recycling/recyclingmeansbusiness.html>.

²⁷ Neil Tangri, Waste Incineration: A Dying Technology, Global Alliance for Incinerator Alternatives, 2003.

²⁸ Kalogirou, E. 2012, October. The development of WtE as an integral part of the sustainable waste management worldwide.

3.0 RECOMMENDATIONS

3.1 Zero Waste Approach

Zero Waste is an approach to resource use that ensures efficiency, recovery, and protection of scarce natural resources. It is both a goal and a plan of action aimed at ending waste disposal in incinerators, dumps, and landfills. The plan encompasses waste reduction, composting, recycling, and reuse, alongside changes in consumption habits and industrial redesign. Zero Waste represents a revolution in our relationship with waste, aiming to safeguard health and improve quality of life for everyone who interacts with waste, including producers, handlers, and the broader community.

The Zero Waste Approach is proven an effective approach to reducing waste. A successful example comes from the City of San Fernando in the Philippines, which initially considered building a WTE facility but shifted to a Zero Waste system in partnership with the NGO Mother Earth Foundation. Within six months, the city drastically reduced municipal waste, cutting landfill use from nearly 90% to 30% over four years. Globally, hundreds of municipalities and cities in Asia, North America, Africa, Europe, and Latin America are embracing Zero Waste and moving away from incineration and landfilling.²⁹

The key elements of a Zero Waste approach include reducing consumption, reusing discards, product redesign to be non-toxic and durable, comprehensive recycling, banning waste incineration, composting or bio-digestion of organic materials, active citizens and worker participation, and policies, regulations, incentives, and financing structures to support these systems.

By adopting a Zero Waste approach, Malaysia can significantly reduce its reliance on incineration, conserve natural resources, decrease landfill use, and lower carbon emissions. This transition will contribute to a more sustainable and resilient waste management system, benefiting both the environment and the community.

3.2 Promote Composting Initiatives

Composting organic waste, such as kitchen scraps, food waste, garden and agriculture waste, is a more sustainable alternative compared to incineration. Composting can significantly reduce the volume of waste sent to landfills, up to 50%, thus extending the lifespan of a landfill. By reducing waste sent to landfills, it helps reduce the cost and carbon emissions that it takes to haul and process waste.

The reality in some places is that limited space prevents waste generators from managing their own waste. In such cases, the second best scenario is setting up composting areas closest to the source. This means that, if organic waste management cannot be done in the household (the source), then the second best place to manage it is in common spaces in the neighborhood like at

²⁹ Felicia Dayrit & Gigie Cruz.. 2019. Picking Up The Baton: Political Will Key To Zero Waste. Global Alliance for Incinerator Alternatives <https://www.no-burn.org/wp-content/uploads/2021/08/San-Fernando.pdf>

the materials recovery facility, or in designated spaces in the community dedicated to managing organic discards.³⁰

Community composting facilities can be established to help households compost their organic waste by offering low-cost compost bins or subsidies for composting tools and services. Public education campaigns are important to raise awareness about the benefits of composting, such as producing nutrient-rich soil for gardening and reducing greenhouse gas emissions from landfills.

By making composting more accessible and feasible, Malaysia can divert a substantial portion of its waste stream from final disposal.

3.3 Enhance Waste Collection and Segregation Infrastructure

Upgrading waste collection and sorting infrastructure is vital for improving the efficiency and effectiveness of recycling programmes. Malaysia should enforce waste segregation at source, and invest in sorting technologies that can increase the recovery rates of recyclable materials and reduce contamination. Enhancements to waste collection systems, such as more frequent pickups and better-designed recycling bins, can also make it easier for waste generators to participate in recycling programmes. By improving the infrastructure, more recyclable materials can be collected for recycling.

3.4 Support Circular Economy Practices

Malaysia can promote circular economy practices involving reducing, reusing, repairing, and recycling products to extend their lifecycle and reduce waste generation. These sustainable practices can also conserve natural resources, decrease landfill use, and lower carbon emissions.

Encouraging local businesses to participate in circular economy networks can create opportunities for resource sharing and collaboration. For example, businesses can collaborate to recycle industrial by-products or repurpose materials that would otherwise be considered waste. By fostering a circular economy, Malaysia can create a more sustainable local economy.

3.5 Mandatory Extended Producer Responsibility (EPR)

Mandatory extended producer responsibility (EPR) programmes can hold manufacturers responsible for the entire lifecycle of their products. For example, companies should set up programmes to take back old products from consumers for proper recycling. These programmes will also require producers to design products that are easier to recycle and have a lower environmental impact. Moreover, legislation supporting EPR can incentivise manufacturers to use sustainable materials and reduce packaging waste. By shifting some of the responsibility for waste management to producers, we can reduce the burden on local waste management systems and promote more sustainable production practices.

³⁰ Global Alliance for Incinerator Alternatives. January 2022. Back to Earth: Composting for Various Contexts. https://www.no-burn.org/wp-content/uploads/2022/01/Back-to-Earth-Organics-Manual_Spread.pdf

3.6 Implement Electronic Waste Collection and Recycling Programmes

Establishing and implementing dedicated electronic waste (e-waste) collection and recycling programmes are essential for managing the growing amount of discarded electric and electronic devices and minimising their environmental impacts. E-waste contains hazardous materials that can harm both the environment and human health if not properly managed. Examples of hazardous substances that can be found in e-waste are beryllium, brominated flame retardants, cadmium, chromium, lead, mercury, nickel, and zinc.³¹

By establishing e-waste recycling centres and partnering with electronics retailers for take-back programmes, the government can ensure safe and efficient disposal of these items. These recycling programmes not only prevent toxic substances from entering landfills and polluting the ecosystem but also allows for the recovery of valuable materials, contributing to resource conservation and economic sustainability.

3.7 Deposit-Refund System

A deposit-refund system can be implemented for beverage containers, batteries, tires, and electronics. This system involves charging a fee at the time of purchase and offering a refund when the product or its packaging is returned for recycling. The deposit-refund system can promote recycling and reduce environmental pollution effectively.³²

Malaysia can also enhance its recycling efforts by introducing Reverse Vending Machines (RVMs), specialised devices designed to automate the collection and recycling of waste, particularly beverage containers such as plastic bottles, glass bottles, and aluminium cans. These innovative machines can help boost recycling rates by providing convenient and accessible deposit return systems, offering incentives to consumers, and helping to reduce glass, metal, and plastic waste.

Consumers simply need to insert used containers into the machine, which then identifies and validates the material, ensuring it meets recycling criteria. Once verified, the machine will then clean and sort the materials, thus minimising contamination.

As a reward for their recycling efforts, users will receive incentives, which could be in the form of monetary refunds, coupons, or tokens redeemable at participating stores. There are a few RVMs in operation in Malaysia. This incentive-based recycling can boost public participation, making it easier and rewarding for individuals to contribute to environmental sustainability.³³

³¹ US EPA. 2013, February 4. Electronic Waste and Demolition. <https://www.epa.gov/large-scale-residential-demolition/electronic-waste-and-demolition>

³² Walls, M. 2011, November 23. Deposit-Refund Systems in Practice and Theory. https://www.researchgate.net/publication/228203610_Deposit-Refund_Systems_in_Practice_and_Theory

³³ Recycle Track Systems. 2019. Reverse Vending Machines – What Are They and How Do They Work? <https://www.rts.com/blog/reverse-vending-machine/>

3.8 Reuse And Refill

To promote sustainability and waste reduction, it is essential to implement reuse and refill programmes. Community-based initiatives can significantly encourage the reuse of everyday items such as water bottles, shopping bags, and food containers. Some restaurants could offer discounts for customer who bringing their own bottles or food containers for takeaway food.

Moreover, convenient refill stations can be installed in public areas and retail stores, making it easier for people to adopt sustainable practices in their daily lives. Examples of convenient refill stations are water refill stations, detergent refill stations, cooking oil refill stations, household cleaner refill stations, and beverage refill stations. These stations can significantly reduce single-use plastic waste. This approach allows people to bring their own bottles to the refill station and purchase products at a discounted price.

To further encourage the establishment of refill stations, the government should provide incentives for companies that invest in these sustainable practices. These incentives could include tax breaks, grants, or public recognition programs. By supporting businesses that invest in refill infrastructure, the government can accelerate the shift towards a more sustainable and circular economy.

4.0 CONCLUSION

In conclusion, it is crucial to consider the numerous disadvantages of WTE incinerators outlined above. While incinerators are marketed as a solution to the growing waste management crisis, they merely transform waste into other forms, often creating more hazardous by-products. This approach does not truly address the core problem of waste; instead, it shifts the burden in a way that may exacerbate the environment and health risks.

Therefore, the Consumers' Association of Penang (CAP) and Sahabat Alam Malaysia view that WTE incinerators is not the right solution for our waste management problem. Instead, we recommend that the government focus on Zero Waste approaches which are cost-effective and safer options that generate jobs while protecting the climate and the environment.

The Zero Waste approach is not only viable compared to WTE incineration, but also contributes to the development of resilient and sustainable communities.

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<https://www.no-burn.org/the-asia-you-need-to-know/>