A BURNING ISSUE: A LEGAL ANALYSIS OF CO-PROCESSING AS A SOLID WASTE MANAGEMENT STRATEGY

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ABSTRACT

The vision of a clean and healthy environment is not just a dream but a necessity for the well-being of the present and future generations. However, the Philippines is drifting further from realizing this vision. Solid waste management remains a problem in the country, which has led to exploring alternative strategies, such as co-processing. Co-processing utilizes combustion to convert waste products into fuel and raw materials in industrial processes, particularly in cement kilns. This study critically analyzes the legal and environmental implications of adopting co-processing as a waste management strategy.

The Implementing Rules and Regulations of the Extended Producer Responsibility Act allow companies to employ co-processing, which directly contradicts Section 20 of the Clean Air Act of 1999, imposing an absolute ban on incineration practices that emit poisonous and toxic fumes. Moreover, co-processing poses risks to fundamental constitutional rights, including the right to a balanced and healthful ecology and the right to health, which are crucial for present and future generations. Co-processing, by contributing to air pollution and the release of toxic substances, could pose serious risks to public health, increasing the incidence of respiratory and cardiovascular diseases among affected populations. Furthermore, co-processing undermines environmentally sound waste management and circular economy principles established in different environmental laws.

This study utilized a doctrinal approach to examine the legal frameworks governing solid waste management in the Philippines, including the Clean Air Act of 1999 and the Extended Producer Responsibility Act of 2022, alongside pertinent jurisprudence, to determine whether co-processing is legally and environmentally permissible. An empirical approach was also employed to assess the environmental and health impacts of co-processing by analyzing scientific data on emissions and their effects.

The findings reveal that currently practiced co-processing does not align with the Philippine legal framework's legislative intent or environmental objectives. While it may offer a short-term solution for waste reduction, its harmful emissions contravene the Clean Air Act and undermine the constitutional rights to a balanced and healthful ecology and public health. Therefore, the study concludes that Rule 12.2.2.2.6 of the Implementing Rules

and Regulations of the Extended Producer Responsibility Act is unconstitutional and must be struck down.

Keywords: co-processing, Clean Air Act, incineration, environment

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CHAPTER ONE: INTRODUCTION

I. Background of the Study

Over the last decade, waste management has escalated into a pressing global issue, but it presents alarming challenges for developing countries like the Philippines. These challenges include handling the growing volume of waste due to inefficient waste management systems, inadequacies in infrastructure management, and other socio-economic impacts.

A major issue in the Philippines is the continuous rise in the amount of waste being produced. The Secretary of the Department of Environment and Natural Resources (DENR) reports that the country generates solid waste production of 61,000 metric tons daily, which is equivalent to filling approximately 37 Olympic-sized swimming pools.[1] The Commission on Audit (COA) has raised similar concerns, projecting that the waste generation could escalate to 24.5 million tons by 2040, a significant rise from 9 million tons in 2000.[2] Furthermore, the DENR's National Solid Waste Management Commission suggests that this figure might exceed 23 million tons as early as 2025.[3] By 2030, the increase could mean an additional five kilograms of waste per person per year, which would be equivalent to filling 23,279 Olympic-sized swimming pools or approximately 99 Philippine Arenas in Bulacan.[4]

The 2023 Performance Report by COA indicates that municipal solid waste primarily originates from residential sources, followed by commercial, institutional, and industrial sectors.[5] In terms of waste composition,

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[1]Cristina Eloisa Baclig, *Risks Loom as Worsening Garbage Mess Pushes Deep PH Dive Into Waste-to-Energy*, PHIL. DAILY INQ., February 01, 2024, *available at* https://newsinfo.inquirer.net/1897796/for-posting-edited-risks-loom-as-worsening-garbage-mess-pushes-deep-ph-dive-into-wasteenergy (last accessed February 9, 2025).

[2]Jelo Ritzhie Mantaring, *Has the Philippines Created a Garbage Problem Too Big to Dig Its Way Out of?,* PHILIPPINE CENTER FOR INVESTIGATIVE JOURNALISM, May 19, 2024, *available at* https://pcij.org/2024/05/19/has-the-philippines-created-a-garbage-problem-too-big-to-dig-its-way-out-of/ (last accessed February 9, 2025).

[3]*Id.*

[4]Athena Mari E. Son, Just Transition to Low-carbon and Climate Resilient Industries: Waste Management Sector (Institute for Labor Studies 2021 Issue Paper – Waste Management Sector, February 10, 2022), *available at* https://ils.dole.gov.ph/issue-paper/2021-issue-papers/just-transition-to-low-carbon-and-climate-resilient-industries-waste-management-sector (last accessed August 26, 2024).

[5]Commission on Audit, Progress in the Achievement of the Goals of the Ecological Solid Waste Management Act Needs Stronger Support and the Cohesive Efforts and Strategies of All Stakeholders

biodegradable materials represent the largest segment, followed by residual and special waste.[6] Among recyclable materials, plastics constitute the largest share, with paper and cardboard being significant contributors.[7] Other recyclable waste also includes metals, glass, textiles, leather, and rubber.[8]

In light of the substantial volume of waste generated, the current waste management system is inefficient in addressing the scale of the problem. The Philippines has one of the highest rates of mismanaged plastic waste recycling worldwide.[9] In 2019, only approximately 28 percent of the key resins consumed were recycled while the unrecycled plastics are either sent to dumpsites and landfills, become litter, or accumulate in sewers, drainage systems, and rivers before eventually entering marine environments.[10] This inefficiency is particularly evident during typhoons, where improperly disposed waste clogs drainage systems and waterways, worsening flooding and causing additional damage to communities. However, it is essential to note that this is not the sole contributing factor. From July 25 to August 5, 2024, the Metropolitan Manila Development Authority (MMDA) removed more than 1,500 tons of trash from the National Capital Region (NCR) after the severe damage caused by Super Typhoon Carina and the southwest monsoon.[11]

Moreover, the waste management infrastructure in the country is having difficulty keeping up with the growing demands effectively, worsening the problem. Many local government units (LGUs) lack the necessary facilities for proper waste segregation, collection, and disposal.[12] The COA found a notable shortage of material recovery facilities (MRFs) in

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(Performance Audit Report PAO 2023-01, May 2, 2023), *available at* https://www.coa.gov.ph/wpfd_file/solid-waste-management-program-pao-2023-01/ (last accessed August 26, 2024).

[6] *Id.*

[7] *Id.*

[8] *Id.*

[9] World Bank, Reducing Plastic Waste in the Philippines: An Assessment of Policies and Regulations to Guide Country Dialogue and Facilitate Action (East Asia and Pacific Region: Marine Plastics Series, 2022), *available at* https://www.pemsea.org/publications/reports/reducing-plastic-waste-philippines-assessment-policies-and-regulations-guide (last accessed August 26, 2024).

[10] *Id.*

[11] Dianne Sampang, *MMDA Collects 1,513 Tons of Garbage After Typhoon Carina Onslaught,* PHIL. DAILY INQ., August 6, 2024, *available at* https://newsinfo.inquirer.net/1969997/mmda-collects-1513-tons-of-garbage-after-typhoon-carina-habagat-onslaught (last accessed February 9, 2025).

[12] Marna Dagumboy Del Rosario, *No Waste Segregation, No Disposal at Sanitary Landfills: DENR*, PHIL. NEWS AGENCY, December 16, 2022, *available at* https://www.pna.gov.ph/articles/1190923 (last accessed August 26, 2024).

the country as only a small fraction of barangays or about 39% were served by available MRFs in 2021.[13]

With the closure of all 355 open dumpsites in the country, LGUs are now more than ever mandated to utilize sanitary landfills (SLFs) as replacements for traditional garbage dumps.[14] According to Department of the Interior and Local Government (DILG) Secretary Benjamin Abalos Jr., only 67.76% of LGUs nationwide have access to SLFs.[15]

However, the Philippine Center for Investigative Journalism (PCIJ) investigation reveals that the country has nearly 300 operational SLFs.[16] Of these, 18 are classified as Category 4 landfills, which can handle over 200 tons of waste daily and are primarily utilized by highly urbanized cities.[17] As of June 2023, four of the largest landfills have reached full capacity, including those in Calamba, Bacolod, General Santos, and Davao.[18] While these sites are planning expansions to extend their operational lifespan, several other landfills are approaching their capacity limits.[19] As a result, it led to the exploration of alternative waste management strategies like co-processing. Given the prohibition on using open dumpsites and inadequate SLFs, the focus is shifting toward exploring alternative waste management strategies.

Co-processing is emerging as an alternative solution to address the waste management crisis in the Philippines. This new concept includes the application of waste materials as alternative raw materials and fuel in industrial operations particularly in cement production.[20] By incorporating municipal solid waste into cement production, this method minimizes the need for new disposal facilities but also provides an alternative source of energy and raw materials.[21]

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[13]Baclig, *supra* note 1.
[14]*Solid Waste Segregation Remains Major Challenge in PH: DENR Chief*, PHIL. NEWS AGENCY, December 16, 2022, *available at* https://www.pna.gov.ph/articles/1175460 (last accessed August 26, 2024).
[15]Chito Chavez, *DILG: PH Produces 61,000 MT of Garbage Daily; 500 LGUs No Access to Sanitary* Landfills, MANILA BULL., January 28, 2024, *available at* https://mb.com.ph/2024/1/27/ph-produces-61-000-mt-of-garbage-daily-500-lg-us-no-access-to-sanitary-landfills (last accessed August 26, 2024).
[16]Mantaring, *supra* note 2.
[17]*Id.*
[18]*Id.*
[19]Mantaring, *supra* note 2.
[20]Wendell de Queiroz Lamas, et al., Waste Materials Co-processing in Cement Industry: Ecological Efficiency of Waste, 19 RENEWABLE AND SUSTAINABLE ENERGY REVIEWS 200 (2013).
[21]Tamara Davison, The Complete Guide to Co-Processing, *available at* https://blog.cleanhub.com/what-is-co-processing#isitenvironmentallyfriendly (last accessed August 26, 2024).

This approach has been officially adopted in the Implementing Rules and Regulations (IRR) of the Extended Producer Responsibility Act of 2022 (EPR Act) as one of the viable waste management strategies.[22] The IRR designates co-processing as a viable waste management strategy, emphasizing its role in the "diversion of recovered waste into value chains and value-adding useful products through recycling and other sustainable methods."[23] Specifically, it states:

> SECTION 12. Adoption, Implementation, and Consideration as Accomplishment of the Activities and Strategies under Section 44-A of the Act, as Amended by the EPR Act of 2022, for Plastic Packaging Waste . — Pursuant to Section 44-D of the Act, as amended by the EPR Act of 2022, Obliged Enterprises, Collectives, or PROs shall, within six (6) months following the effectivity of the Extended Producer Responsibility Act of 2022, establish or phase-in EPR programs for plastic packaging to achieve efficient management of plastic packaging waste, reduced production, importation, supply or use of plastic packaging deemed low in reusability, recyclability or retrievability, and plastic neutrality through efficient recovery and diversion schemes. The EPR programs may include the activities and strategies stated under paragraphs (a) and (b) of Section 44-A of the Act, as amended by the EPR Act of 2022, and Sections 11.1 and 11.2 of the EPR IRR. Any of these activities and strategies may also be adopted and submitted to the NEC as an amendment or supplement to their NEC-registered EPR Program.
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> 12.2. Recovery Programs Aimed at Effectively Preventing Waste from Leaking to the Environment
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[22]Department of Environment and Natural Resources, Rules and Regulations Implementing the Extended Producer Responsibility Act of 2022, Republic Act No. 11898, rule 12.2.2.2.6. (2023).
[23]*Id.*

12.2.2. Diversion of recovered waste into value chains and value adding useful products through recycling and other sustainable methods.

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12.2.2.2.6. **Co-processing**, if applicable and allowed for the specific material, product, or waste; for instance, **coprocessing of non-recyclable or low-quality plastic waste in cement kilns to recover energy and material.**[24]

However, while co-processing offers notable benefits, it simultaneously comes with significant drawbacks. This method releases various harmful substances, such as greenhouse gases, toxic metals, and persistent organic pollutants, all of which can negatively affect the environment.[25] These emissions contribute to severe public health issues, including respiratory and cardiovascular diseases, and the persistent nature of these toxins raises long-term concerns, as they can accumulate in the environment and enter the human body.[26] As a result, this raises serious concerns about the legality and environmental sustainability of co-processing as a waste management strategy.

II. Statement of the Problem

The adoption of co-processing as a waste management strategy does not align with the Clean Air Act of 1999. It violates the constitutional right to a balanced and healthful environment and the right to health.

The Clean Air Act of 1999 guarantees every Filipino's right to a clean and healthy environment, as enshrined in Section 20, which specifically bans incineration or the "burning of municipal, bio-medical and hazardous wastes, which process emits poisonous and toxic fumes."[27] The legislative intent behind this provision is to prevent the release of toxic and harmful emissions that can adversely impact both the environment and public health. Co-

[24]Rules and Regulations Implementing the Extended Producer Responsibility Act of 2022, rule 12.2.2.2.6 (emphasis supplied).
[25]JANE BREMMER, AUSTRALIAN REFUSE-DERIVED FUEL: FUEL PRODUCT OR PLASTIC WASTE EXPORT IN DISGUISE? 30 (2022).
[26]*Id.* at 32.
[27]An Act Providing for a Comprehensive Air Pollution Control Policy and for Other Purposes [Philippine Clean Air Act of 1999], Republic Act No. 8749, § 20 (1999).

processing, however, emits poisonous and toxic fumes that generate adverse environmental and health effects, which directly contradict the intent of Section 20. Additionally, the adverse environmental effects and health hazards linked to co-processing contradict the constitutional mandate for a balanced and healthy environment as well as the promotion of health.

Considering the foregoing, the proponent submits that co-processing does not conform with the current Philippine legal and environmental frameworks.

III. Thesis Statement

While Section 20 of the Clean Air Act of 1999 imposes a total ban on incineration, the Implementing Rules and Regulations of the Extended Producer Responsibility Act of 2022 allow companies to employ co-processing or burn plastic waste as process-engineered fuel/refuse-derived fuel to address the country's solid waste challenges. However, this approach undermines the principle that a statute must be read according to its spirit and intent, leading to excessive emissions of harmful and toxic substances, thereby violating individuals' right to a clean and healthful environment.

IV. Objectives of the Study

The study aims to analyze the legality of co-processing as a solid waste management strategy in accordance with the Philippine environmental framework. Specifically, it aims to:

1. Ascertain the intent of the ban on incineration stipulated under Section 20 of the Clean Air Act of 1999;
2. Analyze whether co-processing contradicts the legislative intent of the ban on incineration and environmentally sound waste management practices enshrined in several laws;
3. Establish the harmful environmental and health implications of co-processing;
4. Discuss how co-processing violates the constitutional right to a balanced and healthful ecology and the right to health; and
5. Propose a clear and precise amendment to IRR of the EPR Act and Section 20 of the Clean Air Act that prohibits the use of co-processing.

V. Significance of the Study

Analyzing the potential of co-processing as a solid waste management option is essential in understanding its implementation's legal, environmental, and health implications. The study explores the legal interpretation of relevant laws, which offers valuable insights to lawmaking bodies and helps them make informed decisions when crafting and revising regulations that promote sustainable and environmentally sound waste management practices. It also aids regulatory bodies in assessing compliance with the Philippine environmental framework, ensuring that stakeholders' objectives are in line with the overarching goal of environment conservation and public health safety.

The study can benefit the companies and industries involved in such practice by fostering a broader discourse about the necessity of adopting strategies that minimize environmental harm. The study encourages these stakeholders to evaluate and improve their waste management methods critically. This can lead to the development and adoption of greener and more sustainable technologies that meet regulatory standards and enhance corporate social responsibilities. With this proactive approach, companies and industries can mitigate any possible legal risks and liabilities and contribute positively to the community.

The study can be highly valuable for environmental advocacy groups and public health organizations to raise awareness and promote initiatives for a cleaner and healthier environment. By presenting evidence-based findings and comprehensive analysis, this study equips these groups with the necessary information to advocate for stricter regulations or alternative waste management methods. This can empower them to push for legislative reforms and advance policies prioritizing the environment and public health.

The study is pivotal in advancing and promoting environmental rights, particularly the right to a clean and healthy environment. With unprecedented environmental challenges, fighting for and protecting these rights becomes critical since the quality of our environment has direct and deep implications for human well-being and the overall quality of life. It thus affirms that a clean and healthy environment is not a vague, abstract concept but a fundamental right to existence.

VI. Research Methodology

For purposes of this study, the proponent will adopt a doctrinal approach. Particularly, the study will involve an in-depth discussion of Congress' deliberations to provide historical and contextual background on the ban on incineration. There will also be an examination of pertinent legislation and an analysis of local jurisprudence to offer a comprehensive perspective regarding solid waste management. Additionally, an analysis of environmental principles and concepts will be conducted to determine their applicability within the Philippine environmental legal framework.

The proponent will also employ an empirical approach to present scientific evidence on the effects of co-processing as a waste management strategy and the current conditions surrounding solid waste management in the country. This will involve referencing supplemental sources such as books, law and scientific journals, articles, and other relevant avenues of research. By integrating both approaches, the proponent will evaluate how co-processing potentially violates constitutional rights to a balanced and healthful ecology and the right to health.

VII. Scope and Limitation of the Study

The primary focus of the study is conducting a legal analysis of the compatibility of co-processing practices with existing environmental laws and constitutional rights in the Philippines. The study will particularly focus on the discussion of Section 20 of the Clean Air Act of 1999, highlighting the legislative intent behind the ban on incineration. As a result, other provisions of the Act will not be extensively discussed. The study will examine the detrimental environmental and health effects of co-processing, focusing on the release of harmful pollutants and compliance with legislative measures aimed at protecting the environment and public health.

With this, the study will not delve into technical engineering solutions and economic feasibility aspects of co-processing. The study will also not discuss other waste management strategies. The analysis will be confined to legal perspectives on co-processing without addressing the technical or practical dimensions of such strategy.

Accordingly, the study will discuss the right to a balanced and healthful ecology and the right to health and their legal reinforcement through various

laws and policies together with relevant jurisprudence. This includes understanding how legal frameworks and judicial interpretations recognize and reinforce these rights. By doing so, the study will discuss legal provisions and doctrines that violate these fundamental rights in the context of co-processing.

The study is specific to the Philippine context, and while it provides insights into international laws, its findings and recommendations are primarily tailored to the legal and environmental framework of the country. However, the study is limited to waste management policies and practices in the Philippines at a national level and may not fully capture the differences in local jurisdictions.

VIII. Definition of Terms

Air Pollutant. Refers to "any matter found in the atmosphere other than oxygen, nitrogen, water vapor, carbon dioxide, and the inert gases in their natural or normal concentrations, that is detrimental to health or the environment."[28]

Co-processing. Refers to the use of waste materials as alternative fuels or raw materials in industrial processes, particularly in cement kilns. [29]

Emission. Refers to "any air contaminant, pollutant, gas stream, or unwanted sound from a known source that is passed into the atmosphere."[30]

Environmentally Sound Waste Management. Means "taking all practicable steps to ensure that hazardous wastes or other wastes are managed in a manner that will protect human health and the environment against the adverse effects that may result from such wastes."[31]

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[28]Philippine Clean Air Act of 1999*,* § 5(a).
[29]Davison, *supra* note 21.
[30]Philippine Clean Air Act of 1999, § 5(h).
[31]This definition is adopted from the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal which specifically defines "Environmentally Sound Management of Hazardous Wastes or other Wastes". Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal art. 2, *opened for signature* Mar. 21, 1989, 1673 U.N.T.S. 57 [hereinafter Basel Convention].

Extended Producer Responsibility (EPR). Pertains to "the environmental policy approach and practice that requires producers to be environmentally responsible throughout the life cycle of a product, especially its post-consumer or end-of-life stage."[32]

Incineration. Refers to "the burning of municipal, bio-medical, and hazardous wastes, which process emits poisonous and toxic fumes.:[33]

Poisonous and Toxic Fumes. Refers to "any emissions and fumes beyond internationally accepted standards, including but not limited to the World Health Organization."[34]

Refused-Derived Fuel. Refers to an alternative fuel during co-processing, which comprises waste materials such as plastics, timber, paper, textiles, and other high-calorific value wastes.[35]

IX. Organization of the Study

The study is divided into five chapters, as outlined below: (1) Introduction, (2) The Philippine Environmental Framework on Waste Management, (3) Establishing the Environmental and Health Implications of Co-processing, (4) The Fundamental Rights Violated by the Use of Co-processing, and (5) Conclusion and Recommendations.

Chapter I provides a general overview of the study, including the background of the study, a statement of the problem, thesis statement, objectives of the study, significance of the study, definition of terms, research methodology, scope and limitations, and organization of the thesis.

Chapter II delves into the Clean Air Act of 1999, focusing, for the most part, on the ban on incineration. With this, it explores the historical context and legislative intent behind this ban to demonstrate how co-processing contradicts this intent. Furthermore, the chapter presents arguments about how co-processing does not align with environmentally sound waste management principles and various environmental laws on waste management. It concludes by addressing contemporary issues and the necessity of reinforcing

[32]An Act Institutionalizing the Extended Producer Responsibility on Plastic Packaging Waste, Amending for This Purpose Republic Act No. 9003, Otherwise Known as the "Ecological Solid Waste Management Act of 2000" [Extended Producer Responsibility Act of 2022], Republic Act No. 11898, § 3(m-1) (2022).
[33]Philippine Clean Air Act of 1999, § 20.
[34]*Id.* § 5(t).
[35]BREMMER, *supra* note 25, at 16.

the legislative intent while exploring genuinely sustainable waste management alternatives.

Chapter III examines the adverse environmental and health implications of co-processing in waste management. It begins with an introduction to co-processing and its operational mechanisms, then investigates its environmental impacts and related health risks. Additionally, the chapter discusses why co-processing is prohibited under the Clean Air Act of 1999.

Chapter IV assesses the potential infringement of co-processing on the right to a balanced and healthful ecology and the right to health. It outlines the constitutional and legal framework in the Philippines for protecting these rights, as stipulated in the 1987 Constitution and subsequent legislation, noting how co-processing threatens both rights. Additionally, it explores how the principle of preventive action and the precautionary principle are applied in the context of co-processing.

Chapter V synthesizes the key legal points from earlier chapters and offers recommendations. It suggests amending the IRR of the EPR Act to remove co-processing as an option and revising Section 20 to ensure clear interpretation consistent with legislative intent.

CHAPTER TWO: THE PHILIPPINE ENVIRONMENTAL FRAMEWORK ON WASTE MANAGEMENT

I. The Clean Air Act of 1999

The Philippines is home to several environmental laws, from clean air and water to wildlife conservation, addressing a wide range of environmental concerns. Among these is Republic Act No. 8749, also known as the Clean Air Act of 1999, a landmark statute enacted in 1999. Before the Clean Air Act of 1999 was enacted, the Philippines faced considerable air quality challenges, particularly in metropolitan areas. In 1990, Metro Manila gained notoriety as one of the world's most polluted cities due to its atmosphere, contaminated with approximately one million tons of pollutive emissions each year.[36] This deterioration is primarily attributable to rapid industrialization, increased vehicle emissions, and inadequate coordination among environmental agencies.[37]

Recognizing the urgent need for a comprehensive approach to address these issues, lawmakers and environmental advocates collaborated to draft the Clean Air Act. The Act is the cornerstone of the environmental framework for the control and management of air pollution.[38] The Act embodies a commitment to environmental protection by enhancing inter-agency coordination within the environmental sector, encouraging public participation and industry self-regulation, and establishing accountability systems for environmental impacts.[39] The Act underscores the country's commitment to protecting Filipinos from environmental and health risks associated with poor air quality.[40] In essence, the Act represents a fundamental shift towards proactive environmental management in the country.

Moreover, the Act recognizes several fundamental rights of the people, as articulated by Senator Gregorio Honasan, the principal sponsor of Senate Bill 1255, in his sponsorship speech, *to wit*:

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[36]S. REC., Vol. 36, No. 26, at 22, 11th Cong.,1st Reg Sess. (October 13, 1998).
[37]*Id.* at 23.
[38]Philippine Clean Air Act of 1999, § 3.
[39]Philippine Clean Air Act of 1999, § 3.
[40]Philippine Clean Air Act of 1999, § 2.

> The Clean Air Act of 1998, Mr. President, ensures people´s right to breathe clean air.
>
> It recognizes people´s right to live with a balanced and healthful ecology and in accord with the rhythm and harmony of nature.
>
> This Act, Mr. President, accepts as a principle people´s right to share equitably in the use and enjoyment of all natural resources: people's right to take part in decision-making that concerns development activities which may impact adversely on the environment; people´s right of access to public or private records necessary for the assessment of environmental risks; and people´s right to bring to court for compensation of personal damages resulting from the adverse impacts on the environment of a project or activity.[41]

It can be seen that at its core, the Act seeks to ensure that the air Filipinos breathe is clean and safe and to preserve the environment by promoting sustainable development practices. Further, Section 4 of the Act outlines rights to be recognized, and the State seeks to guarantee for the citizens, which includes "the right to breathe clean air," "the right to utilize and enjoy all natural resources according to the principle of sustainable development," and "the right to be informed of the nature and extent of the potential hazard of any activity, undertaking or project and to be served timely notice of any significant rise in the level of pollution and the accidental or deliberate release into the atmosphere of harmful or hazardous substances."[42]

The implementation of the Clean Air Act marked a significant step forward in environmental governance in the Philippines. Its multi-faceted approach shows that effective solutions require coordinated efforts across multiple sectors, including government agencies, industries, and the public, aimed to mitigate existing problems and prevent future ones. As environmental issues continue to evolve, the principles established by the Act remain relevant in fostering a cleaner and healthier environment for all.

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[41]S. REC., Vol. 36, No. 26, at 22-23.
[42]Philippine Clean Air Act of 1999, § 4.

II. Intent of the Ban on Incineration

The Clean Air Act of 1999 encompasses a wide range of provisions designed to regulate and manage air pollution from various sources, such as stationary sources, motor vehicles, tobacco smoking, and other mobile sources.[43] One of its key features is the ban on incineration. Section 20 of the Clean Air Act states:

> SECTION 20. Ban on Incineration. — Incineration, hereby defined as the burning of municipal, bio-medical and hazardous wastes, which process emits poisonous and toxic fumes, is hereby prohibited: Provided, however, That the prohibition shall not apply to traditional small-scale method of community/neighborhood sanitation "siga", traditional, agricultural, cultural, health, and food preparation and crematoria: Provided, further , That existing incinerators dealing with bio-medical wastes shall be phased out within three (3) years after the effectivity of this Act: Provided, finally, That in the interim, such units shall be limited to the burning of pathological and infectious wastes, and subject to close monitoring by the Department.[44]

The IRR of the Clean Air Act maintains the provision of Section 20. It reiterates the prohibition of incineration, defining it in the same terms as the Act itself, which provides:

> RULE XXVIII NON-BURN TECHNOLOGIES
>
> Section 1. Incineration Prohibited
>
> Pursuant to Section 20 of the Act, incineration, hereby defined as the burning of municipal, bio-medical and hazardous

[43]Philippine Clean Air Act of 1999, arts. 2, 3, 4, & 5.
[44]Philippine Clean Air Act of 1999, § 20.

> wastes, which process emits toxic and poisonous fumes is prohibited.[45]

The legislative discussions surrounding the Clean Air Act offer critical insights into the intent behind the ban on incineration. Senator Robert Jaworski, in his sponsorship, presents that they have imposed a ban on constructing and operating incineration facilities in the country and a gradual elimination of medical incinerators.[46] This decision is not intended to discriminate against the technology but rather stems from the fact that the combustion activity in these facilities produces toxic emissions, ash, and residues that contain heavy metals like lead, arsenic, cadmium, mercury, and nickel.[47] He also emphasized that banning incineration in the country is a step forward.[48] Senator Jaworski's proposal reflects the intention from the outset to completely ban incineration, indicating a strong stance on prioritizing environmental health over the potential benefits of incineration technology. This phase-out period allowed industries reliant on incineration to adapt to alternative technologies that minimize environmental impacts. The initial ban encompassed all forms of incineration, including medical waste, although the final bill does not include this compressive scope. Under Section 5 of the Act, medical waste means "the materials generated as a result of patient diagnosis, treatment, or immunization of human beings or animals."[49]

Moreover, before the approval of the final draft of the law on the third reading, Senator Honasan mentioned scientific bases to justify the ban on incineration as follows:

> Senator Osmeña (J). What I am asking the sponsor is if he has come into contact with lobbyist or lobbyists who tried to impress upon him their positions as he has formulated this bill.
>
> Senator Honasan. Let me put it this way. We have come across the widest possible grouping. If they include lobbyists, then I will accept that, only for purposes of clarifying the technical issues

[45]Department of Environment and Natural Resources, Rules and Regulations Implementing the Philippine Clean Air Act of 1999, Republic Act 8759, rule XXVIII, § 1 (2000).
[46]S. REC., Vol. 36, No. 26, at 34-36.
[47]*Id.* at 35.
[48]*Id.*
[49] Philippine Clean Air Act of 1999, § 5(l).

that we encountered during the hearings and during the technical working group sessions.

But let me add that the repository of all these information, whose work we took seriously, being the best available expert that would form part of the lead agency that would implement it, and this is the Environmental Management Bureau. We included them; we listened to them, but we did not allow them to unilaterally influence us.

...

Senator Osmeña (J). Is the sponsor familiar or does he know of this NGO called Haribon?

Senator Honasan. Yes, Mr. President. I recall its presence during one of the hearings.

Senator Osmeña (J). How about Greenpeace?

Senator Honasan. Yes, Mr. President.

Senator Osmeña (J). And Mother Earth, Mr. President.

Senator Honasan. Yes, Mr. President

...

Senator Osmeña (J). Does the gentleman know whether these people are getting foreign contributions to support them?

Senator Honasan. No, Mr. President. I only evaluated them based on the quality of the technical information they were presenting to the committee.

Senator Osmeña (J). What is their claim to possession of technical information? I would not doubt that the DENR or the EMB, the Environment Management Bureau would come to the gentleman and he could credibly and justifiably accept what it is

> telling? But what is the basis [of] Greenpeace, Haribon or Mother Earth's claim that they possess technical information?
>
> Senator Honasan. To the gentleman the truth, we did not evaluate first the source of their information. We took at face value the papers or information they presented. This was precisely what we tasked our technical working groups to do — to validate the quality of their information, in coordination with our government agencies.[50]

With this, it can be seen that the legislative framers placed significant reliance on risk assessments conducted by the DENR and the Environmental Management Bureau (EMB) to justify the incineration ban. Additionally, they incorporated technical insights provided by non-governmental organizations concerning the detrimental impacts associated with incineration. Their contribution was part of a broader process conducted by technical working groups in coordination with government agencies.

As for the exceptions to the ban, Senator Juan Flavier clarified that the law's intent is not to cover the traditional activities of the Filipinos, such as burning firewood or rice or coconut husks. However, the intent is to primarily address chemical plants, factories, industrial facilities, and motor vehicles that use harmful chemical fuels in order to prevent air pollution.[51] During the period of amendments, it was clarified that the bill detailed the exceptions so as not to violate the spirit of the provision when it comes to the prohibition of incineration.[52] This distinction was crucial in ensuring the law's applicability to the most harmful practices while respecting traditional practices integral to local communities.

Senator Honasan reiterated the absolute nature of the ban, with exceptions explicitly detailed to prevent misinterpretation. The Senate explains this in the following deliberations:

> Senator Guingona. The incineration is defined and is hereby prohibited. Is that an absolute prohibition, or is it subject to scientific advances that may prove advantageous to society?

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[50]S. REC., Vol. 112, at 36-37, 11th Cong.,1st Reg Sess. (May 13, 1999).
[51]*Id.* at 51.
[52]S. REC., Vol. 36, No. 26, at 17.

> Senator Honasan. There is scientific basis according to the best available expert which the bicameral conference committee has consulted, and this happens to be the Environmental Management Bureau. But this is absolute in the sense that with the exception of certain items like traditional food preparation (*litson*), burning leaves (*siga*) to enhance fruit-bearing trees, and in this case because of the absence of some data, cremation or anything that requires burning is prohibited.
>
> Senator Guingona. How about hospital wastes?
>
> Senator Honasan. Mr. President, considering the present technologies available to hospitals which require some form of incineration, we are giving them three years to phase out these burning technologies.
>
> Senator Guingona. The incineration is banned but there is an escape clause somewhere in the law.
>
> Senator Honasan. It is not an escape clause, Pir. President, but a phase-out period after which the full weight of the ban takes effect.[53]

The discussions during the Senate floor deliberations indicate that, despite the moderation of the ban on incineration, the primary intent of the legislators remains the prevention of the release of harmful emissions and the control of air pollution. The case of *Republic v. Orbecido III* emphasized the long-standing principle that "where the interpretation of a statute according to its exact and literal import would lead to mischievous results or contravene the clear purpose of the legislature, it should be construed according to its spirit and reason, disregarding as far as necessary the letter of the law."[54] The case asserts that where a strict literal interpretation would result in "mischievous results" or fail to achieve the clear purpose of the law, courts

[53]S. REC., Vol. 111, No. 91, at 42, 11th Cong.,1st Reg Sess. (May 12, 1999).
[54]*Republic v. Orbecido III,* 509 Phil. 108, 115 (2005).

should delve deeper into legislative intent to ensure justice and fairness prevail.

III. Environmentally Sound Waste Management

Beyond the ban on incineration, the Clean Air Act promotes non-burn technologies as an alternative method, given that these technologies do not rely on combustion and, therefore, offer a sustainable and environmentally friendly solution. This intent has been consistently emphasized since the Act's enactment. Other environmental legislation has further reinforced it, including the Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990, the Ecological Solid Waste Management Act of 2000, and the Extended Producer Responsibility Act of 2022. These legislative frameworks form a robust foundation for promoting environmentally sound management practices.

A. *The Clean Air Act of 1999*

The Clean Air Act encourages the implementation of comprehensive ecological waste management solutions that eliminate the burning processes altogether.[55] This includes basic practices such as waste segregation, recycling, and composting.[56] Additionally, the Act directs the DENR to promote advanced and environmentally friendly technologies that are designed for handling, treating, and disposing of various types of waste — including sorted, unrecycled, uncomposted, biomedical, and hazardous waste— in a safe and sustainable manner.[57]

Section 19 of the Clean Air Act establishes maximum limits for various pollutants, including carbon monoxide, nitrogen oxides, particulate matter, and heavy metals, from stationary sources such as cement kilns.[58] However, despite these regulatory provisions, the burning of waste in cement kilns leads to the release of hazardous pollutants that remain inadequately controlled. Notably, co-processing under regulated conditions can still result in the formation of prohibited substances such as dioxins and furans[59], which are

[55]Philippine Clean Air Act of 1999, § 20.
[56]*Id.*
[57]*Id.*
[58]Philippine Clean Air Act of 1999, §19.
[59]Lili Yang et. al, *Brominated Dioxins and Furans in a Cement Kiln Co-processing Municipal Solid Waste*, 79 J ENVIRON. SCI., 339 (2019).

classified as persistent organic pollutants (POPs) under the Stockholm Convention.[60] These compounds are among the most notorious environmental toxicants due to their exceptional stability against physical, chemical, and microbial degradation. [61] Their hydrophobic nature contributes to their strong adsorption onto organic materials and soil, while their ability to bioaccumulate exacerbates their toxicity to humans, wildlife, and ecological systems at large. [62] Consequently, the persistence of these harmful byproducts highlights a critical gap in emission controls, undermining the Clean Air Act's fundamental objective of protecting public health and the environment.

B. Toxic Substances and Nuclear Wastes Control Act of 1990

The Toxic Substances and Nuclear Wastes Control Act of 1990 focuses on regulating and managing hazardous and nuclear wastes to minimize environmental and health risks.[63] A key principle of the Act is strictly regulating how manufacturers and handlers produce, utilize, and dispose of toxic substances to address pollution at its source.[64] This approach mitigates the potential risks and harm associated with industrial activities, safeguarding both public health and the environment.

> Section 5 of the Act defines the following:
>
> g) Hazardous substances are substances that present either:
>
> i) Short-term acute hazards, such as acute toxicity by ingestion, inhalation or skin absorption, corrosivity or other skin or eye contact hazards or the risk of fire or explosion; or
>
> ii) Long-term environmental hazards, including chronic toxicity upon repeated exposure, carcinogenicity (which may in some cases result from acute exposure but with a long latent period), resistance to detoxification process such as biodegradation, the

[60]Samuel K. Kirkok et. al, *A Review of Persistent Organic Pollutants: Dioxins, Furans, and Their Associated Nitrogenated Analogues,* S.N. APPLIED SCI., Volume 2, art. number 1729, (2020).
[61]*Id.*
[62]*Id.*
[63]An Act to Control Toxic Substances and Hazardous and Nuclear Wastes, Providing Penalties for Violations Thereof, and for Other Purposes [Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990], Republic Act No. 6969, § 3 (1990).
[64]Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990, § 3

potential to pollute underground or surface waters, or aesthetically objectionable properties such as offensive odors.

h) Hazardous wastes are hereby defined as substances that are without any safe commercial, industrial, agricultural or economic usage and are shipped, transported or brought from the country of origin for dumping or disposal into or in transit through any part of the territory of the Philippines.

Hazardous wastes shall also refer to by-products, side-products, process residues, spent reaction media, contaminated plant or equipment or other substances from manufacturing operations, and as consumer discards of manufactured products.[65]

C. The Ecological Solid Waste Management Act of 2000

The Ecological Solid Waste Management Act of 2000 further strengthened the environmental framework by promoting "environmentally sound methods that maximize the utilization of valuable resources and encourage resource conservation and recovery."[66] While the Act itself does not provide a precise definition of environmentally sound methods, this concept will be understood following the definition provided by the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, defining "Environmentally Sound Management of Hazardous Wastes or Other Wastes" as the "means taking all practicable steps to ensure that hazardous waste or other wastes are managed in a manner which will protect human health and the environment against the adverse effects which may result from such wastes.[67] Thus, an environmentally sound method in waste management or environmentally sound waste management, as adopted from this definition, is one that manages waste in a way that preserves the environment and ensures safety and well-being.

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[65]*Id.* § 5.
[66]An Act Providing for an Ecological Solid Waste Management Program, Creating the Necessary Institutional Mechanisms and Incentives, Declaring Certain Acts Prohibited and Providing Penalties, Appropriating Funds Therefor, and for Other Purposes [Ecological Solid Waste Management Act of 2000], Republic Act No. 9003 (2001).
[67]Basel Convention, *supra* note 31.

Moreover, the Act encourages waste characterization at the initial source, including household, commercial, industrial, and agricultural sources.[68] Subsequently, such waste is segregated into "compostable," "non-recyclable," "recyclable, or "special waste."[69] By adopting these practices, specific and efficient waste processing strategies can be developed for different types of waste, which minimizes the risks of contamination of the environment.

D. The Extended Producer Responsibility Act of 2022

The Extended Producer Responsibility Act of 2022 signifies a pivotal advancement in waste management practices by requiring producers to take accountability for every stage of their products, including the post-consumer phase.[70] This legislation mandates the development and implementation of product waste recovery programs aimed at preventing environmental pollution by diverting recovered waste into value chains and value-adding useful products through recycling and other sustainable methods.[71] This approach not only helps in managing waste more effectively but also supports the advancement of a circular economy. In a circular economy, products are used longer through continuous reuse and recycling of resources, aiming to maximize utility and value by sharing, leasing, repairing, refurbishing, and recycling within a nearly closed-loop system.[72] Through this, the environmental footprint associated with production and consumption is significantly reduced.

E. Challenges in the Environmental Framework On Waste Management

Despite these legislative advancements, significant challenges remain in the clear interpretation of environmental laws. An issue arises with the inclusion of co-processing as a sustainable method under the Act's IRR issued by the DENR.[73] A rigorous analysis of the implications of co-processing reveals that its potential harms often outweigh its environmental benefits. Allowing co-processing while banning traditional incineration could create inconsistencies in the environmental regulatory framework. Including co-

[68]Ecological Solid Waste Management Act of 2000, § 21.
[69]*Id.* § 22.
[70]Extended Producer Responsibility Act of 2022, § 3 (m-1).
[71]*Id.* § 44-A.
[72]Extended Producer Responsibility Act of 2022, § 3 (d-1).
[73]Rules and Regulations Implementing the Extended Producer Responsibility Act of 2022, rule 12.2.2.2.6.

processing as an acceptable practice under the IRR of the EPR Act can be seen as contradictory to the Clean Air Act's original intent and might inadvertently create a loophole that undermines the environmental safeguards set by the earlier laws. Thus, this oversight suggests a potential failure in addressing the core objectives that the Clean Air Act seeks to achieve.

Moreover, co-processing is inconsistent with the principle outlined in the Toxic Substances and Nuclear Wastes Control Act of 1990 because it does not effectively prevent pollution at its source. The Act aims to regulate hazardous substance handling and disposal to avoid release into the environment and mitigate associated risks.[74] Co-processing, on the other hand, makes use of hazardous wastes that are used as substitute raw materials/fuel and may result in toxic pollutants or fumes emission into the air. It does not neutralize or destroy the toxic substances the Act wants to prevent from contaminating the environment. Therefore, co-processing does not minimize environmental hazards and fails to protect public health as intended by the Act.

Furthermore, co-processing also does not adhere to the Ecological Solid Waste Management Act of 2000 on environmentally sound waste management practices which prioritizes ensuring the well-being of people and the environment.[75] Since burning certain types of waste can release harmful chemicals, co-processing, as a pollution-increasing method, is inconsistent with its objectives. Additionally, the focus on using waste as fuel or raw material in industrial processes may overshadow other environmentally sound practices such as recycling, composting, and waste reduction.

In addition, co-processing conflicts with the goals of the EPR Act. The waste management hierarchy prioritizes waste prevention, followed by source reduction and reuse, recycling, energy recovery, and finally, treatment and disposal as the least preferred option.[76] Source reduction or waste prevention is the most environment-friendly way of reducing waste at the source which may be achieved through practices like reusing, bulk purchasing, reducing

[74]Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990, §§ 3 and 5.
[75]Ecological Solid Waste Management Act of 2000, §2.
[76]United States Environmental Protection Agency (EPA), Sustainable Materials Management: Non-Hazardous Materials and Waste Management Hierarchy, *available at* https://www.epa.gov/smm/sustainable-materials-management-non-hazardous-materials-and-waste-management-hierarchy (last accessed August 26, 2024).

packaging, and designing less toxic products.[77] Co-processing falls under the "energy recovery" category within the hierarchy.[78] This approach primarily focuses on waste disposal rather than prevention, reduction, or recycling which are more circular economy-oriented strategies. The Act is supposed to encourage producers to create products that minimize waste and maximize material recovery throughout their lifecycle. In contrast, co-processing tends to lock in linear consumption, where waste is simply managed rather than minimized or repurposed.

Furthermore, the DENR previously released Department Administrative Order (DAO) No. 2010-06 which outlines the guidelines for utilizing alternative fuels and raw materials in cement kilns.[79] This order reaffirms the government's policy to regulate hazardous substances and waste management, ensure compliance with emissions standards, and support resource recovery initiatives.[80] Section 4 of the Order provides that hazardous waste materials may be eligible for co-processing if they meet the criteria of being alternative fuels or alternative raw materials.[81]

Accordingly, Section 3 of the Order defines alternative fuel as "non-traditional fuels, such as waste materials, that provide thermal energy in the production of cement" while alternative raw material is defined as "non-traditional raw materials, such as waste materials, providing minerals essential in the production of cement."[82] On the other hand, waste materials encompasses "any material any material, product, or by-product, liquid or solid, that the generator intends to dispose, or is required by law to dispose."[83]

While these guidelines are in place, inherent risks remain linked to the implementation of DAO No. 2010-06. A significant concern is the omission of plastics from the list of materials deemed unacceptable for co-processing under Section 5.[84] This could be dangerous since plastics may emit harmful

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[77]*Id.*
[78]Angela J. Nagle et al., *A Comparative Life Cycle Assessment Between Landfilling and Co-processing of Waste From Decommissioned Irish Wind Turbine Blades*, J. OF CLEANER PRODUCTION 2020, Volume No. 277, at 2.
[79]Department of Environment and Natural Resources, Guidelines on the Use of Alternative Fuels and Raw Materials in Cement Kilns Department, Department Administrative Order No. 2010-06 [D.O. 2010-06], at 1 (Mar. 12, 2010).
[80]D.O. 2010-06, § 1.
[81]*Id*. § 4
[82]*Id*. § 3.
[83]*Id.*
[84]*Id*. § 5.

fumes when burned, which is counterproductive to the objectives of co-processing and poses potential health risks. Additionally, the variability in waste materials poses another risk. This is because the properties of these materials can lead to unforeseen chemical reactions or incomplete combustion in cement kilns, which may result in the release of pollutants[85] which the guidelines might not fully address. This highlights a gap in the guidelines' ability to anticipate and manage all potential risks associated with using alternative fuel and raw materials.

Nevertheless, the DENR permitted the use of co-processing after the Court's ruling in the *Metropolitan Manila Development Authority* (MMDA) *v. Jancom Environmental Corporation* (Jancom) case. In this case, MMDA and Jancom had entered into a contract for a waste management project.[86] However, President Estrada refused to sign the contract for two reasons: the implementation of the Clean Air Act and the residents' demand for the dumpsite closure.[87] When the MMDA published a new call for proposals for the project, Jancom filed a petition to void the resolution that disregarded their contract and sought new bids.[88] The Supreme Court ruled in favor of Jancom, emphasizing that Section 20 does not absolutely prohibit incineration as a mode of waste disposal as it only bans burning processes that emit poisonous and toxic fumes.[89] However, the Court's interpretation regarding the relative ban on incineration can be argued as an obiter dictum.

It is settled that "an obiter dictum is a remark made, or opinion expressed, by a judge, in his decision upon a cause by the way, that is, incidentally or collaterally, and not directly upon the question before him, or upon a point not necessarily involved in the determination of the cause, or introduced by way of illustration, or analogy or argument. It does not embody the resolution or determination of the court and is made without argument or full consideration of the point. It lacks the force of an adjudication, being a mere expression of an opinion with no binding force for purposes of *res judicata*."[90] In this case, the main issue raised for the court's determination is

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[85]MEKONNEN MASCHAL TAREKEGN & EFREM SISAY AKELE, ORGANOCHLORINE DIOXIN AND FURAN EMISSIONS AND ITS MANAGEMENT PRACTICES 9 (2018).
[86]*MMDA v. Jancom Environmental Corp. et al.*, G.R. No. 147465, 375 SCRA 320 (2002).
[87]*Id.* at 324.
[88]*Id*. at 325.
[89]*MMDA,* 375 SCRA at 338.
[90]*Bermon Marketing Communication Corporation v. Spouses* Yaco, 897 Phil. 810, 818-819 (2021) (citing *Dee v. Harvest All Investment Limited*, 807 Phil. 572, 583 (2017), citing *Land Bank of the Phils. v. Santos*, 779 Phil. 587, 608 (2016), citing *Land Bank of the Phils. v. Suntay*, 678 Phil. 879, 913-914 (2011)).

whether there exists a valid and perfected contract between the Republic of the Philippines and Jancom.[91] The Court resolved the matter affirmatively based on the Civil Code's definitions of what constitutes a contract.[92] The records showed that MMDA accepted Jancom's bid proposal (offer) which effectively gave rise to the meeting of the minds upon the object (waste management project) and the cause (the build-operate-transfer scheme).[93] The Court emphasized that MMDA could only allege that there was no valid and binding contract if there was no valid notice of award, the contract did not bear the signature of the President of the Philippines, and the conditions precedent specified in the contract were not complied with.[94] However, all of these are present and fulfilled in the case at the bar.

The pronouncement on Section 20 was only incidental and was not central to the Court's decision. As such, reference to this case does not carry the weight of a binding precedent for future cases or law-making decisions. Thus, the DENR's reliance on the Court's interpretation of Section 20 as a relative ban to allow co-processing is legally tenuous.

In conclusion, a comprehensive review of the legislative framework demonstrates that a total ban on incineration is not only justified but effectively established through the Clean Air Act and other relevant environmental laws. Although the EPR Act does not explicitly prohibit incineration, its allowance of co-processing under the IRR creates significant contradictions with the core objectives of these laws, which prioritize non-combustion, environmentally sound waste management methods. By permitting co-processing, the legislative intent to prevent pollution and advance sustainable waste practices is undermined. Thus, the existing legal framework demands a definitive and enforceable ban on all forms of incineration, including co-processing, to ensure consistency with environmental principles, protect public health, and promote a circular economy.

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[91] *MMDA,* 375 SCRA at 327.
[92] *Id.* at 331.
[93] *MMDA,* 375 SCRA at 332.
[94] *Id.*

IV. Reinforcing the Legislative Intent Amidst Contemporary Challenges

While the law's intent has remained consistent over time, new circumstances, such as the increasing use of plastic and the presence of more chemicals in plastics, have emerged. Because of this, there are now more issues than Congress initially anticipated. Therefore, it is now more crucial than ever to reinforce the intent not to use incineration.

The widespread usage of single-use plastics and the chemicals they contain has increased environmental concerns in the Philippines. Plastic constitutes the third-largest segment of total waste generated in the Philippines, totaling 2,150,000 tons annually in 2019.[95] 35% of the plastics used by Filipinos end up leaking into the open environment, while 33% are disposed of in sanitary and unsanitary landfills.[96] Due to the country's limited capacity to recycle high-value plastics, only 9% of these are recycled.[97] This mismanagement of plastic waste worsens the issue as plastics not only persist in the environment for hundreds of years but can also harm wildlife and human health. Many hazardous chemicals are involved in the making of plastics, either as fundamental components like bisphenols or as additives that impart properties such as durability, color, and flexibility.[98] Consequently, plastic particles called micro- and nano-plastics can enter the body either through consumption, inhalation, or skin contact.[99]

In order to combat plastic pollution, lawmakers advanced the EPR Act. The law promotes zero-waste management as it moves towards a circular economy. Thus, one of the recovery methods included is co-processing. However, co-processing is criticized as a "false solution" to plastic waste management as it fails to address the root causes of plastic pollution.[100] Co-processing relies on waste as a fuel source, which diminishes the incentive to

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[95]World Wide Fund For Nature Philippines, Extended Producer Responsibility: a Study on the Role of Producer Responsibility Organizations, 2024, *available at* https://wwfph.awsassets.panda.org/downloads/epr-a-study-on-the-role-of-producer-responsibility-organizations.pdf (last accessed August 26, 2024).
[96]*Id.*
[97]*Id.*
[98]VALEREY DENNY, AN INTRODUCTION TO PLASTICS & TOXIC CHEMICALS HOW PLASTICS HARM HUMAN HEALTH AND THE ENVIRONMENT AND POISON THE CIRCULAR ECONOMY 13 (2022).
[99]*Id.* at 13-14.
[100]SourceMaterial, How Plastics Offsetting is Giving Industry a License to Pollute, *available at* https://www.source-material.org/plastic-offsetting-philippines-pcx-verra-cement/ (last accessed August 26, 2024).

reduce waste production at the source.[101] Unlike strategies that aim at eliminating the use or manufacture of plastics, this method merely shifts the problem from landfills to industrial pollution. Burning plastic waste in cement kilns as "alternate fuels" or "refuse-derived fuels" to recover energy leads to the emission of toxic substances, noxious ash, extreme carbon emissions, and waste resources.[102] As a result, this process promotes a linear economy within which the resources are employed for single use only and then disposed of after.[103] Thus, relying on co-processing negates the principles of zero waste management and circular economy that the EPR Act seeks to uphold.

Moreover, co-processing is not a sustainable solution but a short-term intervention in managing plastic waste. Although it may lessen the amount of waste within a given period, it does nothing to address the underlying problem of the continuous production of new plastics. It does not promote the advancement of more sustainable and eco-friendly alternatives. As such, co-processing cannot be viewed as a viable long-term strategy to combat the plastic pollution crisis. Since there are limitations when it comes to the use of co-processing, reinforcing the ban on incineration's clear legislative intent to safeguard the environment and public health from harmful emissions is imperative. This is necessary to respond to the current and future realities of plastic pollution in view of these evolving circumstances.

[101] *Id.*
[102] LEE BELL & PROF. HIDESHIGE TAKADA, PLASTIC WASTE MANAGEMENT HAZARDS WASTE-TO-ENERGY, CHEMICAL RECYCLING, AND PLASTIC FUELS 13 (2021).
[103] *Id.*

CHAPTER THREE: ESTABLISHING THE ENVIRONMENTAL AND HEALTH IMPLICATIONS OF CO-PROCESSING

I. Background of Co-Processing

Co-processing emerged as a technique in modern waste management strategies that replaces traditional methods such as incineration and landfills. Co-processing refers to the incineration conducted in rotary kilns designated and licensed for clinker production.[104] It utilizes combustion to convert waste products into fuel and raw materials, conserving energy and reducing reliance on depleting raw resources.[105] It can be said that co-processing has a two-fold purpose: firstly, it disposes and reduces waste materials and secondly, it contributes to resource and energy conservation. This practice is especially prevalent in the cement industry, which produces the world's most widely used man-made building materials.[106]

The process typically involves several sequential stages: preparation, combustion, energy recovery, and material recovery.[107] During the preparation phase, waste undergoes storage and sorting to eliminate non-combustible or hazardous components.[108] In the combustion phase, waste is incinerated within a cement kiln operating at temperatures approximately reaching 1450°C, yielding alternative fuels and raw materials while effectively destroying waste.[109] This generated heat serves as an alternative to conventional fossil fuels in cement production, constituting the energy recovery phase.[110] Ultimately, minerals and ash from combustion are used as raw materials in the clinker production process during the material recovery phase.[111]

One prominent example of alternative fuels during the combustion phase is Refuse-derived Fuel (RDF). Similar products are known by various names such as Process Engineered Fuel (PEF), Solid Recovered Fuel (SRF), and Tyre-Derived Fuel (TDF).[112] RDF comprises waste materials such as

[104]Lamas et al., *supra* note 20.
[105]Davison, *supra* note 21.
[106]*Id.*
[107]*Id.*
[108]*Id.*
[109]*Id.*
[110]Davison, *supra* note 21.
[111]*Id.*
[112]BREMMER, *supra* note 25, at 16.

plastics, timber, paper, textiles, and other high-calorific value wastes.[113] According to industry data and analysis by Zero Waste Europe, RDF typically consists of 31% plastic, 30% unknown materials, 13% paper, 14% textiles, and 12% wood.[114] They are produced in the form of pellets or bricks through screening, sorting, and separating organic waste and materials that provide the necessary calorific value for combustion from non-combustible items.[115] Calorific value is crucial in evaluating waste feedstock in thermal-based processes as it measures the amount of heat released during combustion processes, indicating the amount of energy produced when a specific mass of waste is completely burned.[116] As such, the preparation phase ensures that only suitable waste materials enter the combustion phase for efficient energy and materials recovery.

In the country, CEMEX Philippines is the leading company in the use of co-processing, notably recognized for its efforts at its Solid Cement Plant in San Jose, Antipolo, where a cement kiln is used to process residual waste.[117] This method reduces the volume of waste directed to landfills and water bodies through simultaneous material recycling and energy recovery.[118] Focusing on three key waste streams—municipal and industrial waste, construction, demolition & excavation waste (CDE), and industry by-products—CEMEX maximizes the use of non-recyclable waste and by-products.[119] CEMEX also benefits from supply partnerships with the Green Alternative Technologies Specialist Inc. (GATSI) RDF plant in Rodriguez, Rizal, which produces 350 tonnes of RDF daily.[120] Operating at extreme

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[113]*Id*.
[114]*Id.* at 31.
[115]Global Alliance for Incinerator Alternatives, Understanding Refuse Derived Fuel, at 8, *available at* https://www.no-burn.org/wp-content/uploads/RDF-Final.pdf (last accessed August 26, 2024).
[116]YUYUN ISMAWATI, ET. AL., REFUSE-DERIVED FUEL IN INDONESIA 55 (2022).
[117]Cemex Holdings Philippines, Cemex Recognized for Its Waste to Energy Co-processing of Residual Waste, *available at* https://www.cemexholdingsphilippines.com/-/cemex-recognized-for-its-waste-to-energy-co-processing-of-residual-waste (last accessed January 8, 2025).
[118]Cemex Holdings Philippines, *supra* note 117.
[119]*Cemex Drives Significant Impact in Circular Economy,* PHIL. DAILY INQ., February 27, 2024, *available at* https://business.inquirer.net/447542/cemex-drives-significant-impact-in-circular-economy (last accessed February 9, 2025).
[120]GREGORIO RAFAEL P. BUETA, PROCESS ENGINEERED FUEL – FUEL PRODUCT OR PLASTIC WASTE EXPORT IN DISGUISE? 23 (2022) (*Cement Makers Partner With Lgus for Alternative Fuel*, PHIL. STAR, November 29, 2013, *available at* https://www.philstar.com/business/2013/11/29/1262021/cement-makers-partner-lgus-alternativefuel).

temperatures of 1,500°C, the kiln ensures the complete breakdown of waste and toxic substances without leaving residual materials.[121]

Republic Cement is another critical player employing co-processing through its Ecoloop initiative which focuses on resource recovery by using plastic waste as a substitute for fossil fuel in cement manufacturing.[122] Unique to cement manufacturing, the high temperatures in the process ensure the complete consumption of alternative fuels, with waste byproducts fully integrated into the final product.[123] Republic Cement has RDF facilities in Bulacan and Teresa, Rizal,[124] and has partnered with organizations like Nestlé Philippines, Colgate-Palmolive, and several LGUs to divert plastic waste from landfills and waterways.[125]

Alongside CEMEX and Republic Cement, Holcim has engaged in agreements with numerous local government units (LGUs) and industrial companies to repurpose waste into alternative low-carbon fuels and raw materials in making cement.[126] Holcim operates plants in Bacnotan (La Union), Norzagaray (Bulacan), Davao City, Lugait (Misamis Oriental), and Mabini (Batangas).[127] Co-processing simultaneously recycles the mineral components of waste and recovers its energy within a single cement manufacturing process.[128] The mineral portion replaces raw materials like limestone and clay, while the combustible fraction serves as fuel for clinker production.[129] Holcim only co-processes waste that has been carefully

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[121]Cemex Holdings Philippines, Co-processing for Sustainable Waste Management Solution, *available at* https://www.cemexholdingsphilippines.com/-/co-processing-for-sustainable-waste-management-solution (last accessed February 9, 2025).
[122]Republic Cement, Republic Cement Achieves Plastic Neutrality, Offers Co-Processing as EPR Solution, *available at* https://www.republiccement.com/post/republic-cement-achieves-plastic-neutrality-offers-co-processing-as-epr-solution (last accessed January 8, 2025).
[123]*Id.*
[124]BUETA, *supra* note *120,* at 24 (Republic Cement, Cement Company Ties Up With Public, Private Sectors to Address Waste Woes, *available at* https://republiccement.com/cement-company-ties-up-with-public-private-sectors-toaddress-waste-woes/)
[125]*Id.*
[126]Holcim Philippines, *Holcim Reuses Over 1M Tons of Wastes in Cement Manufacturing to Drive Decarbonization, Circularity*, *available at* https://www.holcim.ph/holcim-philippines-reuses-over-1m-tons-wastes-cement-manufacturing-drive-decarbonization (last accessed August 26, 2024).
[127]BUETA, *supra* note *120*, at 22 (citing Holcim Philippines. About Us. *available at* https://www.holcim.ph/sites/philippines/files/documents/About_us_brochure.pdf) .
[128]Holcim Philippines, Geocycle Co-processing: A Unique Waste Treatment Solution, *available at* https://www.holcim.com/sites/holcim/files/documents/lafargeholcim_co-processing_geocycle_institutional_brochure.pdf (last accessed February 9, 2025).
[129]*Id.*

segregated, qualified, and pre-treated, focusing on materials that cannot be recycled or reused for technological or economic reasons.[130]

Lafarge Republic also plays a significant role in co-processing, operating three RDF facilities in Luzon—two in Bulacan and one in Teresa, Rizal, which supply fuel to its cement plants.[131] Additional RDF facilities include the Sandoval facility in Pasig, capable of processing up to 600 tonnes of waste daily, and the Payatas RDF facility in Quezon City, producing up to 50 tonnes daily for Luzon-based Lafarge plants.[132]

The combined efforts of these companies demonstrate that co-processing can be a viable solution for waste management, helping to reduce landfill waste and convert non-recyclable materials into valuable resources. Despite the growing advocacy for RDF and co-processing as energy-efficient alternatives to traditional incineration, several critical issues undermine their sustainability. Numerous environmental groups such as Global Alliance for Incinerator Alternatives,[133] Greenpeace Southeast Asia,[134] Mother Earth Foundation[135] and EcoWaste Coalition,[136] have expressed reservations about the potential environmental and public health risks associated with co-processing. Although no legal cases have been filed against co-processing plants thus far, this lack of legal action should not be interpreted as an indicator of safety or sustainability. The absence of litigation does not mitigate the substantial environmental risks inherent in co-processing practices. Thus, its environmental and health impacts must be continuously evaluated and addressed to assess its effectiveness and sustainability.

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[130] *Id.*

[131] BUETA, *supra* note *120*, at 23 (citing Kristine Angelli Sabillo, *Firm Cements Ways to Convert Waste Into Energy*, BUS. INQ., September 21, 2013, *available at* https:// business.inquirer.net/143871/firm-cements-ways-to-convert-waste-into-energy)

[132] *Id.*

[133] Global Alliance for Incinerator Alternatives, Zero Incineration*, available at* https://www.no-burn.org/zero-incineration/ (last accessed February 9, 2025).

[134] Greenpeace Southeast Asia, CP Group's Sustainable Packaging Policy Falls Short in Addressing the Root Cause of Plastic Pollution- Greenpeace Thailand Analysis, *available at* https://www.greenpeace.org/southeastasia/press/64616/cp-groups-sustainable-packaging-policy-falls-short-in-addressing-the-root-cause-of-plastic-pollution-greenpeace-thailand-analysis/ (last accessed February 9, 2025).

[135] ZWE Staff, Civil Society Statement on the Practice of Waste Incineration in Cement Kilns, *available at* https://zerowasteeurope.eu/2016/11/civil-society-statement-on-the-practice-of-waste-incineration-in-cement-kilns/ (last accessed February 9, 2025).

[136] *Id.*

II. Environmental Consequences

The environmental risks associated with co-processing are substantial. Although it can divert waste from landfills and reduce reliance on fossil fuels, it also introduces potential combustion-related hazards. Research revealed that cement kilns have a higher exhaust gas flow rate compared to waste incinerators, which shows that it is a significant factor contributing to the elevated pollution levels emitted by cement kilns.[137] According to the US industry compliance data, the exhaust gas flow rate for each ton of waste burned in a cement kiln is 5-10 times greater than that of a waste incinerator.[138]

One of the primary environmental concerns with co-processing is the emission of pollutants. The incineration of RDF in cement kilns results in the release of a range of harmful substances into the atmosphere.[139] These substances include particulate matter, dioxins, furans, sulfur oxide, nitrogen oxide, heavy metals, and carbon dioxide.[140] Each of these pollutants can have serious risks to both environmental and human well-being.

Particulate matter (PM) ranks among the most prevalent pollutants emitted during cement production. Particulate matter comprises fine solid and liquid particles suspended in the atmosphere, encompassing substances like dust, dirt, soot, and smoke.[141] Identified as one of the nine criteria pollutants under the Clean Air Act, particulate matter is recognized for its potential environmental and public health implications.[142] The production of particulate matter in co-processing during cement production occurs in several chemical processes including sulfate particles from oxidation of sulfur dioxide, organic compounds from raw materials and fuel, and soot particles from incomplete combustion.[143] When these particles mix, they alter atmospheric properties such as light scattering and absorption which accordingly influence climate

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[137]BREMMER, *supra* note 25, at 31.
[138]*Id* at 16-17.
[139]Global Alliance for Incinerator Alternatives, *supra* note 115, at 4.
[140]*Id.* & Zero Waste Europe, Sustainable Finance for a Zero Waste Circular Economy, at 30, available at https://zerowasteeurope.eu/wp-content/uploads/2020/11/zero_waste_europe_report_sustainable-finance-for-a-zero-waste-circular-economy_en.pdf (last accessed August 26, 2024).
[141]Elyssa Lopez, *Health, Environment Concerns Raised as PH Cement Plants Burn Plastic Wastes for Fuel*, RAPPLER, August 13, 2022, *available at* https://www.rappler.com/environment/health-concerns-raised-philippine-cement-plants-burn-plastic-wastes-for-fuel/ (last accessed August 26, 2024).
[142]*Id.*
[143]Zhenzhou Yang et al., *Investigation of Formation Mechanism of Particulate Matter in a Laboratory-scale Simulated Cement Kiln Co-processing Municipal Sewage Sludge*, 234 J. OF CLEANER PRODUCTION 822, 829-830 (2019).

dynamics.[144] Research investigating how co-processing hazardous waste and municipal sewage sludge at cement plants alters nearby particulate matter highlights significant findings. It suggests that particulate matter from the cement industry efficiently generates sulfate and secondary organic aerosols.[145] These emissions considerably affect air quality and contribute to haze formation, which is beyond the impacts of primary emissions alone.[146] Given the relevant findings on particulate matter emissions during co-processing in cement production, it is necessary to reconsider the viability of the practice.

Aside from particulate matter, dioxins and furans are another set of pollutants of concern during co-processing. Dioxins, which refer to polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs), are known for their carcinogenic, teratogenic, and mutagenic properties.[147] As a result, they were among the first pollutants recognized under the Stockholm Convention on Persistent Organic Pollutants.[148] The Convention mandates the signatory parties to implement measures aimed at reducing or eliminating the release of persistent organic pollutants (POPs) into the environment to protect human health and the environment.[149] POPs are "chemicals characterized by long-range transport, persistence in the environment, ability to bio-magnify and bio-accumulate in ecosystems and with substantial negative effects on human health and the environment."[150] They are unintentionally produced by-products of incomplete combustion of chlorinated chemicals.[151] The Stockholm Convention, ratified by 185 parties to date, also classifies cement kilns co-processing hazardous waste as a source category with significant potential for the formation and release of PCDDs and PCDFs.[152] Considering that they are persistent, they can remain in the environment once released which poses

[144]*Id.* at 830.
[145]Zhenzhou Yang et al., *Characterization of PM10 Surrounding a Cement Plant With Integrated Facilities for Co-processing of Hazardous Wastes*, 186 J. OF CLEANER PRODUCTION 831, 836-837 (2018).
[146]*Id.* at 837.
[147]Xiaoyuan Li et al., *Emission Characteristics of Dioxin During Solid Waste Co-processing in the Chinese Cement Industry,* J. OF HAZARDOUS MATERIALS 2023, Volume No. 446, at 2.
[148] *Id.*
[149]Stockholm Convention on Persistent Organic Pollutants, art. 3, *opened for signature* May 22, 2001, 2256 U.N.T.S. 119.
[150]*Id*. annex D.
[151]TAREKEGN & AKELE, *supra* note 85.
[152]ISMAWATI ET. AL, *supra* note 116, at 28.

long-term risks to the environment. Thus, the challenge lies in eliminating the source of the inadvertent formation of such pollutants.

Moreover, concerns surrounding the use of waste plastics in cement kilns have been highlighted. Although waste plastics provide high calorific value, their application is constrained by the corrosive effects of their thermal degradation products. A study showed that halogens released during plastic combustion, such as chlorine and bromine, can lead to severe corrosion in incinerators and cement kiln systems, while their accumulation further limits the system's capacity for recovering energy from plastics.[153] The uncontrolled combustion of halogen-containing plastics, such as PVC, Teflon, and plastics with brominated flame retardants, can release hazardous substances, including acid gases and unintentional POPs.[154] These risks are particularly concerning for the environment and human health if cement kilns do not comply with Best Available Techniques and Best Environmental Practices (BEP) standards when processing halogenated plastics.[155] Notably, such plastics may end up in RDF after being shredded and pelletized as mixed plastics. [156]

In addition to these pollutants, heavy metals also pose a significant environmental concern. A study assessed that the environmental damage linked to co-processing in cement kilns is due to the release of hazardous substances like dioxins and volatile heavy metals in flue gas and the high concentration of nonvolatile heavy metals in cement clinker.[157] This issue is particularly pronounced in developing countries, where the co-processing of wastes containing high levels of heavy metals serves as a common alternative raw material, thereby exacerbating heavy metal concentrations in final cement products.[158] Despite the belief that heavy metals are stabilized during high-temperature calcination, these metals can gradually leach out from cement products leading to potential long-term pollution when exposed to environmental factors like rainfall.[159] Additionally, a study documented a considerable amount of emissions of heavy metals from RDF incineration,

[153]MAGESWARI SANGARALINGAM, MALAYSIA: REPACKAGED WASTE IMPORTS CASE STUDY OF PROCESSED ENGINEERED FUEL 25 (2022).
[154]*Id.*
[155]*Id.*
[156]*Id.*
[157]Qifei Huang et al., *Potential for Serious Environmental Threats from Uncontrolled Co-processing of Wastes in Cement Kilns*, 46 ENVTL. SCI. TECH. 13031, 13031 (2012).
[158]*Id.*
[159]*Id.* at 13032.

mainly showing increased levels during the co-processing of sewage sludge.[160]

Furthermore, carbon dioxide in co-processing raises environmental problems, especially due to its role in climate change. Carbon dioxide is the main greenhouse gas released by human activities, primarily from burning fossil fuels, waste, and biological materials, as well as from specific chemical processes like cement production.[161] While co-processing helps mitigate emissions from landfills, the carbon dioxide it generates still contributes to global warming. Thus, co-processing still has a carbon footprint that must be addressed in the long run.

A study has shown that co-processing alternative fuels, particularly those derived from waste, does not significantly reduce carbon dioxide emissions in cement plants, especially when biogenic CO2 is not treated as carbon-neutral.[162] Likewise, SourceMaterial investigated the estimated carbon emissions from the plastic PCX sent for co-processing, and each metric ton of plastic that PCX submits for "processing" results in the issuance of a credit.[163] It revealed that PCX's current credits would release about 120,000 tons of carbon dioxide emissions, equivalent to those produced by 26,704 petrol cars over a year.[164]

The government's principal legislative action to facilitate the nation's adaptation to climate change is Republic Act No. 9729, commonly known as the Climate Change Act of 2009. Specifically, it aims to "[stabilize] greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."[165] Consequently, the Philippines ratified the legally binding Paris Agreement,

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[160]Dong Lv, et al., *Effects of Co-Processing Sewage Sludge in the Cement Kiln on PAHs, Heavy Metals Emissions and the Surrounding Environment*, 15 INT'L J. OF ENVTL RESEARCH AND PUBLIC HEALTH 698 (2018).

[161] United States Environmental Protection Agency, Overview of Greenhouse Gases, *available at* https://www.epa.gov/ghgemissions/overview-greenhouse-gases (last accessed August 26, 2024).

[162]Ali Hasanbeigi & Navdeep Bhadbhade, Emissions Impacts of Alternative Fuels Combustion in the Cement Industry, *available at* https://static1.squarespace.com/static/5877e86f9de4bb8bce72105c/t/64940fedcc4f547bb072807d/1687425025095/AF+in+Cement+Industry-6.15.2023.pdf (last accessed August 26, 2024).

[163]SourceMaterial, *supra* note 100.

[164]*Id.*

[165]An Act Mainstreaming Climate Change Into Government Policy Formulations, Establishing the Framework Strategy and Program on Climate Change, Creating for This Purpose the Climate Change Commission, and for Other Purposes [Climate Change Act of 2009], Republic Act No. 9729, § 2 (2009).

that contains the Nationally Determined Contributions (NDCs).[166] NDCs represent each country's commitment to lowering national emissions and adapting to the effects of climate change.[167] Article 4 of the Paris Agreement stipulates that each party must "prepare, communicate, and maintain" their updated NDCs and is expected to adopt domestic measures to achieve these targets.[168]

The primary goal of the Paris Agreement. is limiting global warming to below two degrees or ideally 1.5 degrees Celsius[169] For the years 2020 to 2030, the Philippines pledges an ambitious 75% reduction and avoidance of greenhouse gas (GHG) emissions rate, of which 2.71% is unconditional, in agricultural, waste, industrial, transportation, and energy sectors.[170] However, the endorsement of co-processing contradicts these commitments, despite the goal of reducing greenhouse gas emissions. Thus, allowing co-processing to increase the carbon footprint in the cement industry, compromising the effectiveness of these efforts and undermining the objectives outlined in the national and international legal frameworks.

Furthermore, co-processing cannot be considered sustainable under the EPR Act, as it conflicts with the Act's emphasis on circular economy principles. While a study demonstrated that cement kiln co-processing reduced waste by up to 99.5% and cut environmental emissions by 90% compared to incineration, a life cycle analysis revealed that cement kiln co-processing's overall environmental impact was less favorable than incineration and mechanical biological treatment.[171] This is because the environmental benefits of coal savings in cement kiln co-processing are smaller compared to the electricity generation advantages provided by incineration.[172]

The Reuters special report highlights the growing reliance on burning plastic waste in cement kilns as a contentious solution to plastic pollution and

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[166]Paris Agreement to the United Nations Framework Convention on Climate Change art. 9, § 3, *signed* Apr. 22, 2016, T.I.A.S. No. 16-1104.
[167]*Id.*
[168]*Id.* art 4.
[169]*Id.* art 2.
[170]United Nations Framework Convention on Climate Change, Philippines Nationally Determined Contribution (June 2022), *available at* https://unfccc.int/sites/default/files/NDC/2022-06/Philippines%20-%20NDC.pdf.
[171]Vorada Kosajan et. al, *Comprehensive Assessment of Cement Kiln Co-processing Under Msw Sustainable Management Requirements*, 174 RESOURCES, CONSERVATION AND RECYCLING 105816 (2021).
[172]*Id.*

carbon emissions, particularly in developing countries such as the Philippines, Indonesia, and Costa Rica.[173] Major corporations like Unilever, Coca-Cola, and Nestlé have partnered with cement manufacturers to burn plastic as a substitute for coal, promoting it as an environmentally friendly approach that reduces plastic waste and lowers carbon footprints.[174] However, critics argue that this practice releases harmful toxins such as dioxins and particulate matter into the air, posing severe health risks to communities and contributing to air pollution, especially in regions where air quality regulations are poorly enforced.[175] Accordingly, environmental groups warn that this method may undermine broader efforts to reduce plastic production and enhance recycling systems. [176] The initiative, rather than encouraging corporations to adopt sustainable packaging alternatives or invest in innovative recycling technologies, enables corporations to perpetuate the use of single-use plastics without addressing the underlying issues of waste generation and overproduction.[177] In this sense, the burning of plastic waste may inadvertently slow progress toward a truly circular economy, where waste is minimized, and resources are reused or recycled.

In conclusion, co-processing in cement kilns may offer some waste management benefits, but its environmental drawbacks cannot be overlooked. To ensure a sustainable future, it is crucial to explore alternative solutions that minimize environmental harm while still addressing the challenges of waste disposal.

III. Impacts on Public Health

The emission of various pollutants during co-processing poses substantial health risks, affecting not only residents living in proximity to the facilities but also workers within the cement industry. Among the most pressing health concerns related to co-processing are the respiratory and cardiovascular issues associated with air pollution. The Environmental Protection Agency of the United States reports that exposure to air pollutants caused by co-processing can lead to respiratory issues, including lung

[173]Joe Brock, *A Reuters Special Report Trash and Burn Big Brands Stoke Cement Kilns With Plastic Waste as Recycling Falters*, REUTERS, Oct. 28, 2021, *available at* https://www.reuters.com/investigates/special-report/environment-plastic-cement/ (last accessed February 9, 2025)
[174]*Id.*
[175]Brock, *supra* note 173.
[176]*Id.*
[177]*Id.*

inflammation, reduced lung function, and decreased lung function growth.[178] These can also cause aggravation of cardiovascular disease, increased susceptibility to infections, and exacerbation of allergic symptoms.[179] It also said in a statement that replacing coal with plastic does not offer significant climate benefits and that burning plastic waste in cement kilns can generate harmful air pollution, which requires close monitoring.[180] Accordingly, the advisor to the International Pollutants Elimination Network stated, "The cement industry should leap-frog the whole burning-waste paradigm and move to clean fuel."[181]

Similarly, the combustion of RDF in waste incinerators and cement kilns contributes to respiratory and cardiovascular health impacts associated with increased particulate emissions and micro-and nanoparticles.[182] In 2019, air pollution was responsible for 66,230 deaths in the Philippines because of fine particulate matter that penetrates deep into the lungs and enters the bloodstream, heightening the likelihood of cardiovascular and respiratory conditions and impacting other organs.[183]

In Austria, a cement plant emitted hexachlorobenzene (HCB), a toxic and potentially carcinogenic substance, after burning industrial waste contaminated with it.[184] This contamination affected local dairy products and even led to HCB being detected in the blood of nearby residents, posing risks to the nervous system, liver, and thyroid.[185] A subsequent investigation found that the plant's kiln was not operating at the required temperature to fully destroy harmful contaminants like HCB, pointing to failures in both local regulation and the plant's operation.[186]

In Indonesia, the establishment of an RDF facility has faced significant resistance from local residents. Nearby communities, particularly in Goa Gong, have raised complaints about the foul odor from decomposing organic

[178]Hasanbeigi & Bhadbhade, *supra* note 162.
[179]Hasanbeigi & Bhadbhade, *supra* note 162.
[180]Brock, *supra* note 173.
[181]*Id.*
[182]BREMMER, *supra* note 25, at 32.
[183]Centre for Research on Energy and Clean Air, Estimating the Health & Economic Cost of Air Pollution in the Philippines, *available at* https://energyandcleanair.org/wp/wp-content/uploads/2023/02/Philippines-Health-Economic-Cost-Report_v2023.pdf (last accessed August 26, 2024).
[184]Brock, *supra* note 173.
[185]*Id.*
[186]*Id.*

waste and emissions from burning mixed plastics to produce RDF.[187] Since January 2022, residents have protested against PT Reciki, Danone-Aqua, and local authorities, citing adverse impacts on their health and quality of life.[188] Toxic smoke from the burning of waste and RDF production exposed nearby communities to pollutants like dioxins, furans, and heavy metals, causing respiratory issues, nausea, and dizziness, with reports of cancer-related deaths linked to the facility's activities.[189] Residents also complained about odors, leachate intrusion, and the facility's proximity to homes, ultimately leading to its closure in early 2024 after persistent public outcry.[190]

Similarly, in the Philippines, a sari-sari store owner from Teresa, Rizal was recently diagnosed with asthma, which she attributes to the heavy dust from a nearby Republic Cement plant.[191] The plant burns plastic waste as an alternative fuel for kilns through co-processing and produces significant dust known to cause respiratory issues.[192] Although the direct cause of her asthma is undetermined, her condition highlights the potential health impacts of co-processing in the plant's operation.[193] The increased dust and pollutant emissions from such operations can exacerbate respiratory conditions, especially among individuals exposed to these facilities. Thus, the health risks are a daily reality for them, making it imperative for the government to reexamine the use of co-processing to ensure their safety and welfare.

IV. Co-processing *vis-à-vis* Traditional Incineration

Incineration and co-processing are waste management techniques that rely on high-temperature combustion to reduce waste volumes and recover energy. While they are often regarded as efficient solutions, both methods have significant environmental and health drawbacks, largely attributed to their release of toxic emissions. A comparative analysis reveals that these emissions undermine the perceived benefits of incineration and co-processing, making it crucial to reassess their potential role in the EPR Act's goal of

[187]ISMAWATI, ET. AL, *supra* note 116, at 50.
[188]*Id.*
[189]Nexus Foundation, Danone's Backed MRF in Jimbaran Turned to Ashes: Waste Management Failure and Negligence in Bali, *available at* https://www.nexus3foundation.org/2024/07/18/press-release-danones-backed-mrf-in-jimbaran-turned-to-ashes-waste-management-failure-and-negligence-in-bali/ (last accessed February 9, 2025).
[190]*Id.*
[191]Lopez, *supra* note 141.
[192]*Id.*
[193]*Id.*

circular economy and sustainable waste management.

Both incineration and co-processing utilize high-temperature combustion as a core mechanism for waste management. Incineration involves burning waste at temperatures ranging from 850°C to 1,100°C, primarily in standalone facilities designed to reduce waste volume while generating energy. [194] On the other hand, co-processing integrates waste combustion into industrial processes, such as cement production, which requires heating raw materials to around 1,450°C.[195] Both methods utilize extreme heat for combustion, breaking down waste and extracting energy. However, this process often results in the release of harmful pollutants, including particulate matter, greenhouse gases, heavy metals, and persistent organic pollutants such as dioxins and furans.

Data indicates that co-processing in cement kilns often produces higher levels of emissions compared to incineration. For instance, the exhaust gas flow rate in cement kilns is 5–10 times greater per ton of waste burned than in incinerators, leading to elevated pollutant dispersal.[196] This elevated flow rate amplifies the release of toxic emissions into the atmosphere.[197] Both incineration and co-processing are significant contributors to greenhouse gas emissions, notably carbon dioxide. A study revealed that co-processing waste-derived fuels in cement kilns generates carbon emissions equivalent to those of tens of thousands of petrol cars annually[198] while incinerators release more carbon dioxide per unit of electricity than alternative methods like recycling and reuse, contributing heavily to greenhouse gas emissions.[199] Thus, neither method aligns with climate goals, as both prioritize waste destruction over reducing greenhouse gas emissions or adopting carbon-neutral strategies.

The long-term risks associated with these emissions are particularly concerning. In both methods, persistent pollutants such as dioxins and heavy metals can accumulate in ecosystems, causing irreversible environmental

[194]Afzal Husain Khan et. al, *Municipal Solid Waste Generation and the Current State of Waste-to-energy Potential: State of Art Review,* ENERGY CONVERSION AND MANAGEMENT 115905 (2022).
[195]John Vijgen and Dr.Ir. Ron McDowall, Cement Kiln Co-Processing (High Temperature Treatment), *available at* http://www.ihpa.info/docs/library/reports/Pops/June2009/DEFSBC_LogCEMENTKILN_180608_.pdf (February 9, 2025).
[196]BREMMER, *supra* note 25, at 16-17.
[197]*Id.*
[198]SourceMaterial, *supra* note 100.
[199]Vorada Kosajan et. al, *supra* note 171.

damage. Incineration is notorious for emitting significant amounts of harmful pollutants, including mercury, dioxins, and particulate matter, disproportionately affecting low-income and minority communities.[200] Their inefficiency in energy production worsens their environmental impact, as they destroy large amounts of reusable materials while emitting substantial climate pollution.[201] However, co-processing is similarly hazardous, particularly in its role as a source of heavy metal contamination and POP formation. The high-temperature conditions in cement kilns do not guarantee the destruction of hazardous substances, leading to the release of pollutants that can bioaccumulate in ecosystems.[202]

Furthermore, the health risks associated with emissions from both methods underscore their shared drawbacks. Research indicates that exposure to waste incineration is linked to significant adverse health effects, including elevated risks of cancer, reproductive issues, and other diseases.[203] Notable findings include increased risks of non-Hodgkin lymphoma, sarcoma, and bowel cancer, as well as preterm delivery, reduced sperm quality, congenital anomalies, and infant deaths, often associated with pollutants like dioxins, heavy metals, and polycyclic aromatic hydrocarbons.[204] Co-processing poses similar health hazards, particularly for communities near cement plants. Reports from countries like Indonesia and the Philippines highlight instances of respiratory illnesses, nausea, and even cancer-related deaths among residents near co-processing facilities.

From a sustainability perspective, both methods exhibit inherent limitations. Incineration destroys large quantities of reusable materials, undermining the principles of a circular economy. Co-processing, while reducing reliance on fossil fuels, often fails to prioritize material recovery and recycling. Life cycle analyses suggest that co-processing has a less favorable environmental impact than alternatives like mechanical biological treatment, which emphasize resource efficiency and energy recovery.[205] As a result, neither method aligns effectively with modern waste management goals

[200]Global Alliance for Incinerator Alternatives, Garbage Incineration: What a Waste, *available at* https://www.no-burn.org/wp-content/uploads/Garbage-Incineration-What-a-Waste-factsheet.pdf (February 9, 2025)
[201]*Id.*
[202]Samuel K. Kirkok et. al, *supra* note 60.
[203]Peter W. Tait et. al, The Health Impacts of Waste Incineration: a Systematic Review, 44 AUSTRALIAN AND NEW ZEALAND J. OF PUBLIC HEALTH 40 (2020).
[204]*Id.*
[205]Vorada Kosajan et. al, *supra* note 171.

aimed at sustainability and reduced environmental harm.

Incineration and co-processing share numerous technical and practical similarities, particularly in their reliance on high-temperature combustion and their significant emissions of toxic pollutants. Both methods contribute substantially to air pollution, greenhouse gas emissions, and public health risks, presenting challenges for their integration into sustainable waste management systems. A shift toward alternative waste management strategies—emphasizing recycling, composting, and material recovery—is essential for minimizing harm and fostering a more sustainable future which is in line with the goals of the EPR Act.

V. Banned Activity under the Clean Air Act

Co-processing should be classified as a banned activity pursuant to Section 20 of the Clean Air Act. As determined, the intent to ban incineration lies in recognizing the harmful and toxic emissions generated by the process. The ban intends to protect the environment and public health from any detrimental effects of such pollutants.

Co-processing is often promoted as a distinct and potentially more sustainable alternative to incineration. This is primarily because its method involves the transformation of waste into fuel and raw materials through burning rather than merely reducing waste into ash, as in traditional incineration. However, a closer examination of the scientific findings revealed that co-processing does not offer a significant advantage in terms of overall environmental impact.

While it is true that co-processing aims to maximize waste material, the fundamental process involves burning, which the lawmakers were primarily trying to avoid. Accordingly, it can be said that it is also not entirely emission-free. These emissions include dangerous pollutants which could degrade environmental quality or endanger human health. Moreover, co-processing does not fall under any of the specific exceptions that allow incineration. Thus, it should not be considered a permissible activity under this provision.

Furthermore, it is important to note that the ban on co-processing does not infringe upon the equal protection clause of the Constitution. As provided by jurisprudence, this clause is “directed principally against undue favor and individual or class privilege. It is not intended to prohibit legislation which is

limited to the object to which it is directed or by the territory in which it is to operate."[206] The equal protection clause allows classification provided they meet four criteria: 1) it is reasonable, which means that it is based on substantial distinctions, 2) it must be germane to the purpose of the law, 3) it must not be limited to existing conditions only, and 4) it must apply equally to each member of the class.[207]

In this case, the classification of co-processing as a banned activity is grounded in the legitimate interest of safeguarding the environment and public health. This prohibition cannot be said to be arbitrary because it is only a measured response to specific environmental concerns previously discussed. The ban is also not intended to discriminate against any particular individual or group but rather to ensure that all waste management practices are held to the same standard of scrutiny under the Clean Air Act. The equal protection clause is not violated by prohibiting co-processing.

Considering the foregoing, co-processing should be regarded as a form of incineration and thus fall under the prohibition established in Section 20 of the Clean Air Act.

[206] *Zomer Development Company v. Special Twentieth Division of the Court of Appeals*, G.R. No. 194461, 928 SCRA 110, 127 (2020).
[207] *Id*. at 134.

CHAPTER FOUR: THE FUNDAMENTAL RIGHTS VIOLATED BY THE USE OF CO-PROCESSING

I. Right to a Balanced and Healthful Ecology

Article II, Section 16 of the 1987 Constitution is a seminal provision that embodies the fundamental aspect of ensuring a healthy environment for the benefit of all citizens. It states that "the State shall protect and advance the right of the people to a balanced and healthful ecology in accord with the rhythm and harmony of nature."[208] This clause is enshrined within the Declaration of Principles of the Constitution which delineates the guiding principles of the government. Although it is not laid out under the Bill of Rights, this right has been firmly established within the Philippine legal framework and subsequently recognized as an enforceable right.

Prior to the enactment of the 1987 Constitution, the right to a balanced and healthful ecology was already codified under Presidential Decree 1151, also known as the Philippine Environmental Policy of 1977.[209] Section 3 of this Decree states that "In furtherance of these goals and policies, the Government recognizes the right of the people to a healthy environment. It shall be the duty and responsibility of each individual to contribute to the preservation and enhancement of the Philippine environment."[210]

On June 10, 1987, the late President Corazon Aquino promulgated Executive Order No. 192, otherwise known as "The Reorganization Act of the Department of Environment and Natural Resources." This order laid the foundation for managing the nation's resources, in alignment with the constitutional mandate to uphold the right to a balanced and healthful ecology.[211] Section 3 of this Order stipulates:

> Section 3. Declaration of Policy. It is hereby declared the policy of the State to ensure the **sustainable use, development, management, renewal, and conservation of the country's forest, mineral, land, off-shore areas and other natural**

[208] PHIL. CONST. art. II, § 16.
[209] Philippine Environmental Policy, Presidential Decree 1151, § 3 (1979).
[210] *Id.*
[211] Office of the President, Providing for the Reorganization of the Department of Environment, Energy and Natural Resources, Renaming It as the Department of Environment and Natural Resources, and for Other Purposes, Executive Order No. 192, series of 1987 [E.O. No. 192, s. 1987].

> **resources**, including the protection and enhancement of the quality of the environment, and equitable access of the different segments of the population to the development and use of the country's natural resources, not only for the present generation but for future generations as well. It is also the policy of the state to recognize and apply a true value system including social and environmental cost implications relative to their utilization, development and conservation of our natural resources.[212]

Furthermore, Section 4 of the Order provides:

> Section 4. Mandate. The Department shall be the **primary government agency responsible for the conservation, management, development and proper use of the country's environment and natural resources**, specifically forest and grazing lands, mineral resources, including those in reservation and watershed areas, and lands of the public domain, as well as the licensing and regulation of all natural resources as may be provided for by law in order to ensure equitable sharing of the benefits derived therefrom; for the welfare of the present and future generations of Filipinos.[213]

Subsequently, the right to a balanced and healthful ecology is reaffirmed as a primary concern of the State when it is restated under the 1987 Administrative Code of the Philippines.[214] This is evident in Section 1, which outlines the State's commitment to ensuring the responsible exploration, development, and management of the country's natural resources while maintaining ecological balance and maintaining environmental quality.[215]

The landmark case of *Oposa v. Factoran* shaped environmental jurisprudence by recognizing the right to a balanced and healthful ecology as an enforceable right and establishing a precedent for environmental rights in the Philippines.[216] In this case, a group of minors, acting through their parents, has filed a complaint against the DENR seeking the cancellation of current

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[212]*Id.* § 3 (emphasis supplied)
[213]*Id.* § 4 (emphasis supplied).
[214]Instituting the "Administrative Code of 1987" [ADMIN CODE], Executive Order No. 292, bk. IV, tit. XIV, ch. 1, § 1 (1987).
[215]*Id*. (emphasis supplied).
[216]*Oposa v. Factoran*, G.R. No. 101083, 224 SCRA 792 (1993).

timber license agreements and an end to the issuance of new licenses.[217] It was alleged that the resulting deforestation and environmental damage because of the continued granting of the licenses infringed upon their constitutional rights to a balanced and healthful ecology.[218] However, the lower court dismissed the petition asserting that these minors lacked a valid cause of action and that granting the relief would result in the impairment of the contract.[219]

The Court ruled on the novel issue of *locus standi* in favor of the minors, determining that their right to sue on behalf of future generations is grounded in the concept of intergenerational responsibility, specifically concerning the right to a balanced and healthful ecology.[220] This liberalized rule on standing is now embedded in Section 5 of Rule II of the Rules of Procedure for Environmental Cases which allows the filing of a citizen suit in environmental cases.[221] This provision asserts that "any Filipino citizen in representation of others, including minors or generations yet unborn, may file an action to enforce rights or obligations under environmental laws."[222]

The Court also discussed that such right considers the "rhythm and harmony of nature," where nature means "the created world in its entirety" and rhythm and harmony includes "the judicious disposition, utilization, management, renewal, and conservation of the country's forest, mineral, land, waters, fisheries, wildlife, off-shore areas, and other natural resources to the end that their exploration, development, and utilization be equitably accessible to the present as well as future generations."[223] Accordingly, the concept of intergenerational responsibility signifies that " every generation has a responsibility to the next to preserve that rhythm and harmony for the full enjoyment of a balanced and healthful ecology."[224] Thus, the minor's assertion of their right to a healthy environment simultaneously fulfills their obligation to protect this right for future generations.[225]

Moreover, the Court also expressly declared that the right to a balanced and healthful ecology is an enforceable right, holding equal importance to the

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[217] *Oposa*, 224 SCRA , at 796-797.
[218] *Id.* at 799.
[219] *Id.* at 800.
[220] *Id.* at 802-803.
[221] RULES OF PROCEDURE FOR ENVIRONMENTAL CASES, A.M. No. 09-6-8-SC, rule II, § 5 (April 3, 2010).
[222] *Id.*
[223] *Oposa,* 224 SCRA, at 803.
[224] *Oposa,* 224 SCRA, at 803.
[225] *Id.*

civil and political rights enumerated in the Bill of Rights.[226] The Court stated that this right is so fundamental that it does not require explicit mention in the Constitution as it is assumed to have existed since the beginning of humanity.[227] Additionally, this right includes the obligation to avoid causing harm to the environment.[228] Thus, any violation or disregard of this right by those responsible for respecting and upholding provides a valid basis for legal action. constitutes grounds for legal action.[229] This principle is highlighted in the exchange between Commissioners Wilfrido Villacorta and Adolfo Azcuna during the 1986 Constitutional Commission discussions:

> "MR. VILLACORTA:
>
> Does this section mandate the State to provide sanctions against all forms of pollution — air, water and noise pollution?
>
> MR. AZCUNA:
>
> Yes, Madam President. The right to healthful (sic) environment necessarily carries with it the correlative duty of not impairing the same and, therefore, sanctions may be provided for impairment of environmental balance."[230]

Furthermore, the Philippine environmental framework is notably consistent in advocating for the right to a balanced and healthful ecology. Beyond the principle of environmentally sound waste management discussed before, environmental laws provide evidence of this commitment. Aside from the principle of environmentally sound waste management, environmental laws stress the right to a balanced and healthful ecology. For instance, Section 2 of the Clean Air Act provides that "the State shall protect and advance the right of the people to a balanced and healthful ecology in accord with the rhythm and harmony of nature."[231] Similarly, the Ecological Solid Waste Management Act of 2000 is designed to ensure that public health and the environment are protected through responsible waste management practices as specified in Section 2.[232] Additionally, Section 3 of the Toxic Substances

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[226] *Id.* at 805.
[227] *Id.*
[228] *Id.*
[229] *Id*. at 808.
[230] *Oposa,* 224 SCRA, at 805.
[231] Philippine Clean Air Act of 1999, § 2.
[232] Ecological Solid Waste Management Act of 2000, § 2.

and Hazardous and Nuclear Wastes Control Act prohibits the improper disposal of hazardous wastes, that present unreasonable risk and/or injury to health or the environment.[233] Collectively, these statutes demonstrate a coherent approach that reflects the constitutional protection granted to citizens, ensuring their right to a balanced and healthful ecology through the implementation of comprehensive policies that address various aspects of environmental management.

In the international arena, the United Nations General Assembly (UNGA) made a remarkable advancement on July 28, 2022, by passing a resolution that recognizes every person's right to a clean, healthy, and sustainable environment.[234] This is to address the alarming threat of air pollution, which has become one of the most severe environmental challenges globally and is associated with approximately seven million premature deaths annually.[235] The historic global recognition of this right reflects the increasing awareness and urgency surrounding environmental issues and public health.

This right encompasses both substantive elements which are "clean air; a safe and stable climate; access to safe water and adequate sanitation; healthy and sustainably produced food; non-toxic environments in which to live, work, study and play; and healthy biodiversity and ecosystems" and procedural elements which are "access to information, the right to participate in decision-making, and access to justice and effective remedies, including the secure exercise of these rights free from reprisals and retaliation."[236] Both elements are equally important as they ensure every person's right to a healthy living environment.

The UNGA resolution further urges states, international organizations, businesses, and other relevant stakeholders to take concerted actions to realize the right to a healthy environment.[237] These measures include adopting policies, enhancing international cooperation, strengthening capacity-

[233]Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990, § 3.
[234]The Human Right to a Clean, Healthy and Sustainable Environment, G.A. Res. 76/300, U.N. Doc. A/RES/76/300 (July 28, 2022).
[235]World Health Organization, New WHO Global Air Quality Guidelines aim to save millions of lives from air pollution, *available at* https://www.who.int/news/item/22-09-2021-new-who-global-air-quality-guidelines-aim-to-save-millions-of-lives-from-air-pollution (last accessed August 26, 2024).
[236]Report of the Special Rapporteur on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy and Sustainable Environment, *Right to a Healthy Environment: Good Practices,* at 5-18, Human Rights Council, U.N. Doc. A/HRC/43/53 (Dec. 30, 2019) (by David R. Boyd).
[237]The Human Right to a Clean, Healthy and Sustainable Environment, *supra* note 234, at 4.

building, and continuing to share good practices to intensify efforts toward achieving a clean, healthy, and sustainable environment for all.[238]

By recognizing the intrinsic connection between the environment and human rights, the UNGA elevates the right to a healthy environment as a fundamental human right. This right is currently legally recognized in more than 80% of UN Member States through constitutions, legislation, and regional treaties.[239] The resolution, though not legally binding[240], is a significant milestone as it strengthens the idea that the realization of other human rights is inherently dependent on a healthy environment.

While the right to a clean and healthy environment guaranteed in the Philippine Constitution and reinforced by several laws offers a solid framework for judicious protection and conservation of the country's resources, the environmental implications of co-processing present troubling challenges that undermine this fundamental right.

Co-processing can produce harmful pollutants, including particulate matter, dioxins, furans, and heavy metals, and an increase in carbon emissions. Particulate matter can degrade air quality and affect climate dynamics; the unintended production of dioxins and furans can present long-term risks; the heavy metals can contaminate the ecosystem; and elevated carbon dioxide levels contribute to global warming. This collective environmental harm is inconsistent with the constitutional mandate to maintain the rhythm and harmony of nature and all laws recognizing the right to a balanced and healthful ecology. Through its environmental provisions, the Constitution underscores the importance of maintaining the rhythm and harmony of nature, a principle that is directly challenged by co-processing's adverse effects, which are to generate persistent and potentially hazardous pollutants.

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[238] *Id*.

[239] Special Rapporteur on the Human Right to a Clean, Healthy and Sustainable Environment, *The Right to a Healthy Environment: A User's Guide*, at 8, U.N. Doc A/HRC/RES/55/2 (Apr. 22, 2024) (by David R. Boyd).

[240] International Institute for Sustainable Development, UNGA Recognizes Human Right to Clean, Healthy, and Sustainable Environment, *available at* https://sdg.iisd.org/news/unga-recognizes-human-right-to-clean-healthy-and-sustainable-environment/#:~:text=The%20UN%20General%20Assembly%20(UNGA,and%20sustainable%20environment%20for%20all (last accessed August 26, 2024).

Furthermore, the *Oposa* decision highlights the concept of intergenerational responsibility. Co-processing's environmental impact raises questions about whether such practice meets the obligation to save from harm the environment for generations to come. Many pollutants associated with co-processing have long-lasting effects that can persist in the environment, potentially compromising the ability of future generations to enjoy a clean and healthy environment. The cumulative emissions and pollution resulting from co-processing contribute to long-term environmental degradation, directly contradicting the principle of intergenerational responsibility.

Given these considerations, it is evident that the right to a balanced and healthful ecology is at risk if the government continues to endorse co-processing without addressing its environmental consequences. Thus, alternative and more sustainable waste management practices must be explored and implemented instead to safeguard this right for both the existing and subsequent generations.

II. Right to Health

The right to health is another fundamental human right enshrined under Section 15 of Article II of the Constitution. This provision mandates that "the State shall protect and promote the health of its people and cultivate health consciousness among them."[241] The intent of the law for this right to be of paramount consideration is evident in the case of *Imbong v. Ochoa*. Following this, Congress enacted Republic Act No. 10354, otherwise known as the Responsible Parenthood and Reproductive Health Act of 2012 (RH Law), which guarantees universal access to methods of contraception, fertility control, sexual education, and maternal cases.[242] Petitioners from various sectors of society assailed the constitutionality of the RH Law asserting that the law violates various sections of the Article II of the 1987 Constitution including the right to health.[243] The Court upheld that the right to health is a constitutional component of the right to life, with numerous provisions under Article XIII detailing the State's obligation to promote public health.[244] Most importantly, the Court emphasized that these constitutional provisions are

[241]PHIL. CONST. art. II, § 15.
[242]*Imbong v. Ochoa,* G.R. No. 204819, 721 SCRA 146 (2014).
[243]*Imbong,* 721 SCRA, at 262.
[244]*Id.* at 314.

self-executory which means it requires no additional legislation to be enforceable. [245] Otherwise, it would undermine the Constitution's authority.[246]

It is also important to comprehend the interconnectedness of the right to health with other fundamental rights, especially the right to a balanced and healthful ecology. This connection was underscored in the case of *Dela Cruz v. Manila Electric Co.,* where the Court ruled that "intrinsic in the right to a balanced and healthful ecology is the right to health."[247] The Court also reiterated the rulings in *Oposa v. Factoran* and *Laguna Lake Development Authority v. Court of Appeals* which characterize the rights as "united" and "in consonance", respectively.[248] This indicates that the right to health is integral not only to individual well-being but also to broader environmental concerns.

In addition to constitutional and jurisprudential frameworks, legislative measures demonstrate lawmakers' commitment to upholding the right to health in relation to the right to a balanced and healthful ecology. Just as the Clean Air Act, the Ecological Solid Waste Management Act of 2000, and the Toxic Substances and Hazardous and Nuclear Wastes Control Act safeguard the right to a balanced and healthful ecology, these statutes also contribute to the advancement of health interests of the people.

However, despite these legislative efforts, the adverse effects of co-processing pose significant health concerns, as pointed out in the previous chapter. The nearby communities and workers at the cement plants that utilize co-processing are at high risk of acquiring severe health implications due to prolonged exposure to harmful pollutants. This issue is exemplified in *Osmeña v. Garganera*, where the Court ordered the immediate closure of the Inayawan sanitary landfill.[249] The Court cited the elevated health risks faced by nearby residents, businesses, informal settlements, and waste pickers due to pollution levels at the dump site's present condition.[250]

The pollutants released by co-processing have been associated with respiratory and cardiovascular diseases, which contradicts the legislative

[245] *Id.* at 316.
[246] *Id.*
[247] *Dela Cruz et. al v. Meralco*, 889 Phil. 659, 667 (2020).
[248] *Id.*
[249] *Osmeña v. Garganera*, 828 Phil. 560 (2018).
[250] *Id.* at 573.

measures set to protect individuals' well-being. Consequently, the negligence of the government in preventing such environmental hazards contravenes its obligation to maintain health standards mandated by the Constitution and individuals. This potentially infringes upon the right to health of the affected population. Furthermore, the right to health is intrinsically linked with the right to a balanced and healthful ecology, as discussed. The use of co-processing poses a pressing danger to the environment that could result in injurious consequences to public health. Therefore, there is a threatened violation of the constitutional right to health.

III. Application of the Principle of Preventive Action

The principle of prevention action, also known as the preventive principle, is the anticipatory principle to avoid foreseeable risks, requiring States and other entities to exercise due diligence by not only avoiding environmental harm but also actively implementing measures to prevent it.[251] This principle emphasizes the importance of taking preventive measures at an early stage to avoid any damage before it occurs.[252] With this, it emphasizes preventing harm before it happens, rather than just reacting after the damage is done. This principle is acknowledged in international law as demonstrated in the *Pulp Mills* case, where the Court highlighted the following:

> The principle of prevention, as a customary rule, has its origins in the due diligence that is required of a State in its territory. The Court further noted that "A State is thus obliged to use all the means at its disposal in order to avoid activities which take place in its territory, or in any area under its jurisdiction, causing significant damage to the environment of another State.[253]

The preventive principle is paramount in addressing environmental and public health concerns associated with co-processing. Scientific findings have shown that co-processing activities from cement kilns increase emission levels, posing environmental and human health hazards. Given the substantial risks of co-processing, adopting a more stringent approach rather than merely

[251]LESLIE-ANNE-DUVIC-PAOLI, THE PREVENTION PRINCIPLE IN INTERNATIONAL ENVIRONMENTAL LAW 8 (2018).
[252]Mary Stevens, *The Precautionary Principle in the International Arena*, 2 SUSTAINABLE DEVELOPMENT LAW AND POLICY 13, 13 (2002)
[253]Pulp Mills on the River Uruguay (Arg. v. Uru.), Judgement, ¶101 (Apr. 20, 2010), *available at* https://www.icj-cij.org/sites/default/files/case-related/135/135-20100420-JUD-01-00-EN.pdf (last accessed August 26, 2024).

regulating the practice is prudent, which may not be adequate to mitigate the risks effectively. This evidence supports the need for a preventive approach, advocating for a ban on co-processing to avoid foreseeable harm.

By prohibiting co-processing, any foreseeable harm to human health and the environment can be prevented before they escalate into irreversible problems. With this, the principle acts as a guiding framework for the government and other concerned stakeholders to act promptly and decisively to prevent the use of co-processing. Thus, this approach contributes to the long-term sustainability of the environment and enhancement of health welfare.

IV. Application of Precautionary Principle

In addition to the prevention principle, the precautionary principle is another key concept in environmental law that advocates that potential environmental harm should be addressed, even if there is minimal predictability about the outcome. The principle gained prominence in the 1992 Rio Declaration on Environment and Development.[254] Specifically, Principle 15 states that "Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."[255] This means that the principle mandates that activities and substances potentially harmful to the environment should be regulated and possibly prohibited, even if no conclusive or overwhelming evidence is available as to the harm or likely harm they may cause to the environment.[256] Thus, it is safer to be cautious when dealing with environmental risks. As to the burden of proof, the modern approach directs that the individual or entity seeking to undertake an activity must demonstrate that it will not harm the environment.[257] This mandates polluters to demonstrate that their activities will not harm or significantly impact the environment before being permitted to proceed with the proposed activities.[258]

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[254]U.N. Conference on Environment and Development, *Rio Declaration on Environment and Development,* annex I, princ. 15. U.N. Doc. A/CONF.151/26/Rev. I (Vol. I) (August 12, 1992).
[255]*Id.*
[256]PHILIPPE SANDS ET AL., PRINCIPLES OF INTERNATIONAL LAW 222 (3d. ed. 2015)
[257]*Id.*
[258]*Id.*

In the Philippines, the precautionary principle is adopted as a rule of evidence under the Rules of Procedure of Environmental Cases. Rule I, Section 4 (f) defines the precautionary principle as "when human activities may lead to threats of serious and irreversible damage to the environment that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that threat."[259] Additionally, Rule 20 of the Rules provides:

RULE 20

PRECAUTIONARY PRINCIPLE

> SECTION 1. Applicability.—When there is a lack of full scientific certainty in establishing a causal link between human activity and environmental effect, the court shall apply the precautionary principle in resolving the case before it. The constitutional right of the people to a balanced and healthful ecology shall be given the benefit of the doubt.
>
> SECTION 2. Standards for application.—In applying the precautionary principle, the following factors, among others, may be considered: (1) threats to human life or health; (2) inequity to present or future generations; or (3) prejudice to the environment without legal consideration of the environmental rights of those affected.[260]

Moreover, the judiciary has extensively examined and applied the precautionary principle in several cases. The principle was invoked in *International Service for the Acquisition of Agri-Biotech Applications, Inc. v. Greenpeace Southeast Asia* to address concerns related to the introduction and dissemination of genetically modified organisms (GMOs) despite the insufficiency of scientific evidence or lack of scientific data surrounding the harm of bioengineered eggplants.[261] The Court observed that the precautionary principle should be applied as a last resort in the Rules of

[259]RULES OF PROCEDURE FOR ENVIRONMENTAL CASES, rule 1, § 4 (f).
[260]RULES OF PROCEDURE FOR ENVIRONMENTAL CASES, rule 1, § 4 (f).
[261]*International Service for the Acquisition of Agri-Biotech Applications, Inc. v. Greenpeace Southeast Asia (Philippines)*, G.R. No .209271, 776 SCRA 434 (2015).

Evidence, especially when uncertainty, the possibility of irreversible harm, and the possibility of serious harm coincide.[262]

Given the uncertainty surrounding the potential damage of co-processing to its magnitude in the Philippines, the situation warrants caution. The available scientific data on the effects of exposure to toxic substances may be insufficient, which complicates a full assessment of the potential damage. Thus, where the "scientific evidence is insufficient, inconclusive or uncertain and preliminary scientific evaluation indicates that there are reasonable grounds for concern that the potentially dangerous effects on the environment and human health,"[263] the precautionary principle could be applied.

First, threats to human life or health are paramount in applying the precautionary principle to co-processing. Co-processing releases toxic substances, which can cause severe health issues and diminish the quality of life. Second, the precautionary principle addresses inequity to present or future generations resulting from co-processing. The long-term accumulation of toxic substances in the environment can have intergenerational effects as they persist in the ecosystem and food chains. Lastly, the prejudice to the environment posed by co-processing necessitates the application of the precautionary principle. Co-processing can cause irreversible damage to the ecosystem, primarily affecting air quality and soil and water resources. Considering the factors considered in applying the precautionary principle, the use of co-processing must be halted before further harm materializes. Therefore, the people's right to a clean, healthy, and sustainable environment should be prioritized.

The cement plant in Teresa, Rizal, which utilizes refuse-derived fuel (RDF), exemplifies the need for applying the precautionary principle to address potential risks to public health and the environment. Despite scientific uncertainty about the full extent of harm from its emissions, reported respiratory issues among residents who attribute their health concerns to heavy dust and harmful emissions from the facility near their houses[264] necessitate immediate regulatory action. The precautionary principle calls for preventive measures, including suspending potentially harmful practices, to

[262]*Id.* at 606.
[263]EU's Communication on Precautionary Principle (Commission adopts Communication on Precautionary Principle), *available at* https://www.gdrc.org/u-gov/precaution-4.html (last accessed August 1, 2024).
[264]Lopez, *supra* note 141.

avert further environmental degradation and protect human health, even in the face of scientific uncertainty.

The use of RDF in co-processing introduces hazardous pollutants that could accumulate, posing long-term risks to both the community and future generations. To address these risks, the precautionary principle can be implemented in several ways. First, regulatory agencies could enforce comprehensive emissions testing and update air quality standards to assess the plant's environmental impact thoroughly. Second, the government could require the plant to adopt cleaner technologies to reduce the release of harmful toxins. Third, policymakers could impose a moratorium on RDF co-processing until updated environmental and health impact studies are conducted, ensuring that decisions are informed by the latest scientific evidence. Given the inadequacy of air quality monitoring systems and outdated regulations in the use of co-processing, the precautionary principle necessitates proactive actions to prevent irreversible harm.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATION

Conclusion

The Philippines is a country grappling with several environmental issues, one of the most critical being solid waste management. The urgency for alternative waste management strategies is undeniable, given the rampant accumulation of waste, ineffective waste management systems, and insufficient infrastructure. With this, the country has established a comprehensive legal framework to address these concerns, but implementing co-processing as a viable solution raises challenges in terms of legal and environmental considerations. These challenges revolve around the inconsistencies with the existing legal framework, particularly the Clean Air Act, the principle of environmentally sound waste management, and the fundamental right to a balanced and healthful ecology and right to health.

These challenges emphasize the need to reexamine this approach thoroughly and adopt more sustainable solid waste management strategies in the country. Through doctrinal and empirical approaches, the proponent provided a comprehensive legal and regulatory framework regarding solid waste management and determined the effects of co-processing.

The fundamental issue arises from the inconsistency of co-processing with the existing laws and regulations. The legislative intent behind Section 20 of the Clean Air Act is clear – to prevent any form of burning activity that could release harmful emissions.[265] While there may be varying interpretations of the extent of the ban on burning, the underlying principle is to minimize the release of harmful substances into the atmosphere. Given that co-processing, by its very nature, involves burning and the emission of potentially toxic and poisonous substances, it contradicts Section 20 of the Philippine Clean Air Act.[266] This inconsistency with the law raises significant concerns about the legality of co-processing as a waste management practice.

Similarly, it is incompatible with the principle of environmentally sound waste management, which has been consistently reinforced by laws such as the Extended Producer Responsibility Act, the Ecological Solid Waste Management Act, and the Toxic Substances and Hazardous and Nuclear

[265]S. REC., Vol. 112, at 35-36.
[266]Philippine Clean Air Act of 1999, § 20.

Wastes Control Act. By permitting co-processing, the government would essentially endorse a counterproductive practice to sustainable waste management efforts. Co-processing may help reduce waste in landfills, but it does so at the expense of releasing harmful pollutants into the environment. This approach contradicts the goal of attaining waste minimization and embracing sustainable technologies. Thus, it is crucial to prohibit co-processing as a waste management practice to ensure alignment with the legislative objectives.

Moreover, co-processing undermines the constitutional right to a balanced and healthful ecology, as enshrined in Article II, Section 16 of the Constitution.[267] The landmark case of *Oposa v. Factoran*[268] solidified this right as enforceable and emphasized intergenerational responsibility, obligating each generation to preserve the environment for future generations. Scientific data and industry analysis show that co-processing contributes to the release of harmful air pollutants, including dioxins, furans, particulate matter, heavy metals, and carbon dioxide.[269] Consequently, the accumulation of such pollutants has long-term consequences such as degradation of air quality, severe ecosystem damage, and exacerbated global warming[270], affecting not only the present generation but also the future ones. Therefore, the practice of co-processing represents the systemic failure to adhere to the constitutional mandate for a clean and healthy environment.

The right to health is another fundamental right guaranteed by the Philippine Constitution under Article II, Section 15.[271] The study highlights how the right to health is intrinsically linked to a balanced and healthful ecology, considering how environmental conditions significantly impact public health.[272] Legal precedents have also underscored the importance of safeguarding this right against any activities that may pose health risks.[273] Studies indicate that exposure to dangerous pollutants can cause respiratory and cardiovascular diseases.[274] In light of these potential hazards, co-

[267]PHIL. CONST. art. II, § 16.
[268]*Oposa,* G.R. No. 101083, 224 SCRA.
[269]Global Alliance for Incinerator Alternatives & Zero Waste Europe, *supra* note 140.
[270]Zhenzhou Yang et al., *supra* note 143; TAREKEGN & AKELE, *supra* note 85 & United States Environmental Protection Agency, *supra* note 161.
[271] PHIL. CONST. art. II, §15.
[272] *Dela Cruz et. al*, 889 Phil.
[273]*Osmeña v. Garganera,* 828 Phil.
[274]BREMMER, *supra* note 25, at 32.

processing must not be permitted which is essential to protect the health and safety of the people near the facilities.

In addressing these environmental and health concerns, applying the principle of preventive action and the precautionary principle is paramount. Given the potential risks associated with co-processing, this preventive principle supports co-processing prohibition before the damage becomes irreversible. Accordingly, since the full extent of the impact of co-processing is not entirely clear, it is prudent for the government to prioritize environmental and health considerations and avoid practices that could potentially lead to adverse effects. The government must err on the side of caution, prioritizing the constitutional right to a balanced and healthful ecology.

Considering all the aforementioned statements, the proponent forwards that the Philippines, by allowing for the use of co-processing, goes against the very principles enshrined in the Clean Air Act and the whole environmental framework of the country. Co-processing threatens and violates the right to a balanced and healthful ecology and the right to health. In conclusion, Rule 12.2.2.2.6 of the IRR of the EPR Act is unconstitutional since it is violative of Article II, Section 16 of the 1987 Constitution of the Philippines.

Recommendation

A. Striking Down Rule 12.2.2.2.6

The proponent respectfully recommends that Rule 12.2.2.2.6 of the IRR of the EPR Act regarding the provision allowing co-processing to be declared as void. It is important to clarify that the EPR Act does not explicitly allow co-processing; this provision was only introduced in the IRR. The EPR Act should not be deemed void because it serves as a critical framework for advancing effective waste management practices and promoting sustainability. The issue lies not with the EPR Act itself but with certain provisions in the IRR that may compromise its effectiveness, particularly the inclusion of co-processing as a waste management option.

Instead of undermining the entire Act, the focus should be on ensuring that the IRR aligns with the waste management hierarchy emphasized in the product neutrality option. The DENR should advocate for strict adherence to the waste management hierarchy, which emphasizes a sequence of preferred

waste management practices, starting with the most sustainable options and moving down to less desirable methods. By following this hierarchy, the management of waste can significantly reduce its environmental impact, contributing to the goal of achieving zero waste.

The top priority in the waste management hierarchy is directly reusing packaging as either a product or a product component. This approach is highly sustainable, as it lessens the need for new raw materials and reduces waste. For example, when containers are collected and cleaned for reuse, the demand for new packaging materials is directly reduced.[275] By prioritizing reuse, companies actively contribute to a circular economy where products remain used for as long as possible.

Mechanical recycling ranks as the second-best option in the hierarchy. Mechanical recycling involves processes designed to recover plastics through mechanical means, such as grinding, washing, separating, drying, re-granulating, and compounding.[276] The resulting components can be used to produce new plastic products, serving as a substitute for virgin plastics.[277] Accordingly, this can lower the overall environmental footprint thereby helping in closing the loop of materials within the economy. For example, plastic bottles can be collected, cleaned, and recycled to manufacture new plastic bottles or other plastic items.[278]

Chemical recycling is a more complex process that breaks down plastics into their basic monomers, which can then be reused as raw materials in the petrochemical industry.[279] Though this method requires more energy than mechanical recycling, it helps recover materials that are otherwise hard to recycle.[280] When mechanical and chemical recycling are not feasible, alternative recycling methods come into play. These might include repurposing waste materials for construction, arts, crafts, or other innovative applications.[281] In this regard, alternative recycling generates more value

[275]Rules and Regulations Implementing the Extended Producer Responsibility Act of 2022, rule 12.2.2.2.1.
[276]European Bioplastics, Mechanical Recycling, *available at* https://docs.european-bioplastics.org/publications/bp/EUBP_BP_Mechanical_recycling.pdf (last accessed August 26, 2024).
[277]*Id.*
[278]Rules and Regulations Implementing the Extended Producer Responsibility Act of 2022, rule 12.2.2.2.3.
[279]*Id.* rule 12.2.2.2.4.
[280]Royal Society of Chemistry, Chemical Recycling, *available at* https://www.rsc.org/globalassets/22-new-perspectives/sustainability/progressive-plastics/explainers/rsc-explainer-6---chemical-recycling.pdf (last accessed August 26, 2024).
[281]Rules and Regulations Implementing the Extended Producer Responsibility Act of 2022, rule 12.2.2.2.5.

beyond the perceived end life of a product by creatively reusing materials that would otherwise be landfilled.

For waste that cannot be reused or recycled, safe disposal in SLFs that meet strict environmental standards is the last resort. However, this option should be avoided whenever possible to minimize discharges of the waste discarded in the landfill into land, air, and water, which makes it environmentally problematic.

To ensure consistent adherence to sustainable waste management practices and protect the environment, it is essential to amend the IRR by providing a provision that reads as follows:

> **Rule 12.2.2.6. The strategies enumerated under Rule 12.2.2.2 shall be considered the exclusive options for the management and diversion of value chains and value-adding useful products. No other methods shall be deemed acceptable for compliance purposes.**

The revised provision should stipulate that only the strategies outlined in Rule 12.2.2.2 are acceptable for managing and diverting packaging waste. Excluding co-processing emphasizes the commitment to methods that are more directly aligned with environmentally sound waste methods and have a lower environmental footprint. Accordingly, there must be an immediate cessation of co-processing activities in all facilities in the Philippines. The cessation serves as a precautionary measure essential to guarantee that all potential environmental and health impacts are minimized, thereby protecting the fundamental rights of the current and future generations.

It is crucial to emphasize that recycling and reducing should remain the top priorities. A focused approach towards zero waste and upstream solutions highlights that the most effective strategy is to minimize waste generation in the first place. With this, the government should incentivize investments in accessible and sustainable waste management solutions and collaborate with industries to drive innovation for cleaner, greener practices. By adopting these strategies, the government can significantly safeguard the environment and public health and pave the way towards a greener future for the present and future generations.

B. Amendment to the Clean Air Act of 1999

Furthermore, the proponent proposes that Section 20 of the Clean Air Act be reexamined as to its interpretation by analyzing the provision's language to develop a regulatory solution addressing the worsening solid waste management in the country. Sec. 20 of the Clean Air Act is the specific law governing incineration. Applying the principle of statutory construction that a statute must be read according to its spirit and intent, Sec. 20 should be interpreted to align with its overarching goal of environmental protection. The current provision states that "incineration, hereby defined as the burning of municipal, biomedical, and hazardous waste, which process emits poisonous and toxic fumes, is prohibited."[282] Given that co-processing fundamentally involves burning waste, which releases toxic and poisonous fumes into the environment and results in injurious consequences to public health, it directly undermines the lawmakers' intent to minimize such hazards. The proponent takes the position that the current wording of Section 20 is ambiguous regarding the extent of the prohibition on incineration. The lack of clarity has led to conflicting interpretations, particularly concerning whether the law constitutes a total ban on all forms of incineration.

This ambiguity has been exploited by certain industries and stakeholders who justify the use of co-processing as long as emission standards are met – a stance endorsed by the DENR following the *MMDA v. Jancom* decision.[283] This interpretation allows for practices such as co-processing, where waste is burned in cement kilns, potentially releasing toxic emissions. Thus, to resolve this ambiguity, the proponent thus suggests amending Section 20 to reflect the legislative intent regarding the prohibition of incineration. The following is the proposed amendment to Section 20:

> Section 20. Ban on Incineration. – **Any form** of incineration, defined as the burning of municipal, bio-medical, and hazardous wastes using any technology—**including but not limited to traditional incinerators, cement kilns, refuse-derived fuel systems, waste-to-energy plants, other industrial burners or any other analogous methods** —which process **results in the emission** of poisonous and

[282] Philippine Clean Air Act of 1999, § 20.
[283] *MMDA*, 375 SCRA at 338.

toxic fumes, is hereby prohibited. The prohibition shall not cover the following:

1. Traditional small-scale method of community/neighborhood sanitation “siga”;
2. Traditional, agricultural, cultural, health, and food preparation; and
3. Crematoria.

The amendment precisely clarifies that what is prohibited is any form of incineration and specifies the only applicable exceptions. By explicitly stating that all incineration practices, any kind of circumvention of the law is covered, thereby closing any potential loopholes within the evils that the law seeks to suppress or correct. The definition of incineration as "the burning of municipal, biomedical, and hazardous waste, which process emits poisonous and toxic fumes," is maintained, emphasizing the harmful nature of such processes. To reiterate, the purpose of Section 20 is to ban incineration in order to safeguard the environment and public health from any risks brought about by this activity.

However, it is explicitly clarified that the prohibition applies universally to all forms of incineration technology, ensuring that no incineration practices are left unaddressed. This comprehensive approach prevents any potential circumvention of the law through alternative technologies or methods of waste burning that might otherwise escape regulation. By providing a clear and detailed outline of what constitutes incineration and what does not, the amendment strengthens the enforceability of the ban and ensures that its objectives are effectively met.

The proponent considers filing a Petition for Writ of Kalikasan as a remedy to address the environmental and public health concerns posed by co-processing operations in the Philippines. Under Section 1, Rule 7, Part III of the Rules of Procedure for Environmental Cases, the writ serves as a judicial remedy for violations or threatened violations of the constitutional right to a balanced and healthful ecology arising from unlawful acts or omissions of public officials, employees, private individuals, or entities. Specifically, it states:

> Section 1. Nature of the Writ. — The writ is a remedy available to a natural or juridical person, entity authorized by law,

> people's organization, non-governmental organization, or any public interest group accredited by or registered with any government agency, on behalf of persons whose constitutional right to a balanced and healthful ecology is violated, or threatened with violation by an unlawful act or omission of a public official or employee, or private individual or entity, involving environmental damage of such magnitude as to prejudice the life, health or property of inhabitants in two or more cities or provinces.[284]
>
> To avail of this remedy, the following elements must be established:
>
> > (1) there is an actual or threatened violation of the constitutional right to a balance and healthful ecology;
> >
> > (2) the actual or threatened violation arises from an unlawful act or omission of a public official or employee, or private individual or entity; and
> >
> > (3) the actual or threatened violation involves or will lead to an environmental damage of such magnitude as to prejudice the life, health or property of inhabitants in two or more cities or provinces.[285]

In line with this framework, the writ of kalikasan has been described as a "judicial relief from threatened or actual violation/s of the constitutional right to a balanced and healthful ecology of a magnitude or degree of damage that transcends political and territorial boundaries. Accordingly, it "provide[s] a stronger defense for environmental rights through judicial efforts where institutional arrangements of enforcement, implementation[,] and legislation have fallen short" and seeks "to address the potentially exponential nature of large-scale ecological threats."[286]

In the context of co-processing in the Philippines, the proponent asserts that co-processing operations, particularly the burning of waste in cement kilns, constitute a threatened violation of the constitutional right to a balanced and healthful ecology. This claim is grounded in the fact that co-processing

[284] RULES OF PROCEDURE FOR ENVIRONMENTAL CASES, rule VII, §1.
[285] *Paje v. Casino*, 752 Phil. 498, 539 (2015).
[286] *Id.*

emits harmful pollutants and toxins into the environment, which may include particulate matters, dioxins, furans, heavy metals, ash gases, and carbon dioxide. This unlawful act, justified by certain industries under the guise of meeting emission standards, contravenes the legislative intent to prohibit incineration as outlined in Section 20 of environmental laws. The potential magnitude of environmental damage satisfies the requirement for the writ since plants using co-processing technology are located across different provinces, exposing a wide population to harmful pollutants and toxic emissions poses risks to public health and contributes to the degradation of air quality, water resources, and ecosystems in multiple regions.

In line with the current discussion and arguments, the amendment of Sec. 20 addresses the question surrounding the use of co-processing. Accordingly, the recommendation cures the defect which the petition seeks to address. This clarification will resolve any existing confusion about whether a total ban on incineration is intended, thereby providing clear guidelines for all stakeholders, including the government, cement industries, and environmental groups. Consequently, the DENR will have a stronger legal foundation to enforce the rules and take necessary actions against violations, leading to more consistent and effective enforcement of environmental laws. Companies and industries would also be inclined to adopt more environmentally friendly and socially responsible waste management strategies.

ANNEX I

Republic of the Philippines
Department of Environment and Natural Resources
Visayas Avenue, Diliman Quezon City
Tel. Nos.
Website: https://denr.gov.ph/ /Email: web@denr.gov.ph

Date

DENR ADMINISTRATIVE ORDER
NO. 2024-_____

SUBJECT: REVISED IMPLEMENTING RULES AND REGULATIONS FOR REPUBLIC ACT NO. 11898, "AN ACT AN ACT INSTITUTIONALIZING THE EXTENDED PRODUCER RESPONSIBILITY ON PLASTIC PACKAGING WASTE, AMENDING FOR THIS PURPOSE REPUBLIC ACT NO. 9003, OTHERWISE KNOWN AS THE "ECOLOGICAL SOLID WASTE MANAGEMENT ACT OF 2000"

xxx

Rule 12.2.2 Diversion of recovered waste into value chains and value-adding useful products through recycling and other sustainable methods.

Rule 12.2.2.1. The reduction of plastic waste that may be achieved through diversion of packaging waste into value chains or value-adding useful products may be accounted as one of the measures to achieve product neutrality under the EPR programs. Such diversion may be accomplished through any sustainable methods that promote circular economy, as recognized under the EPR Act of 2022, its EPR IRR, and

other administrative issuances of the Department, the Bureau, or other government agencies. Consideration for plastic or product neutrality shall be based on the same material and product for which waste has been avoided through diversion when compared to the baseline volume of plastic waste from the year prior to the implementation of this diversion program. The brand of the packaging product or waste diverted is not relevant.

Rule 12.2.2.2. To benefit from this product neutrality option, Obliged Enterprises, Collectives, or PROS shall submit to the NEC, a plan that ensures that a target amount, expressed in the appropriate unit mass like kilograms, of their packaging (or equivalent packaging of other brands), is diverted into the value chain in a way which maximizes their re-use as material, products, or component of products, based on the following hierarchy:

12.2.2.2.1. Reuse as product or as a component of product; for instance, collection and cleaning of containers for reuse.

12.2.2.2.2. Mechanical recycling: for instance, collection of wasted PET bottles to manufacture new PET bottles.

12.2.2.2.3. Mechanical recycling of material for the manufacturing of other products; for instance, collection and recycling of PET bottles to manufacture other PET items.

12.2.2.2.4. Chemical Recycling to convert plastics to monomers as feedstock for the petrochemical industry.

12.2.2.2.5. Alternative Recycling for construction materials, arts and crafts, among others.

12.2.2.2.6 Safe disposal in SLFS.

xxx

Rule 12.2.2.6. The strategies enumerated under Rule 12.2.2.2 shall be considered the exclusive options for the management and diversion of waste into value chains and value-adding useful products. No other methods shall be deemed acceptable for compliance purposes.

xxx

All orders and other policy issuances or directives that are contrary or inconsistent with this Administrative Order are hereby superseded or modified accordingly.

This Administrative Order shall take effect fifteen (15) days after publication in a newspaper of general circulation and upon acknowledgment of receipt of a copy by the Office of the National Administrative Register.

Name of DENR Secretary

ANNEX II

Republic Act of the Philippines
House of the Representatives
Quezon City
Nineteenth Congress
Third Regular Session
House Bill No. ____

AN ACT AMENDING SECTION 20 OF REPUBLIC ACT NO. 8749, OTHERWISE KNOWN AS THE CLEAN AIR ACT OF 1999

Be it enacted by the Senate and the House of Representatives of the Philippines in Congress assembled:

SECTION 1. Section 20 of Republic Act No. 8749, otherwise known as the "Clean Air Act of 1999" is hereby amended to read as follows:

"Section 20. Ban on Incineration. – **Any form** of incineration, defined as the burning of municipal, bio-medical, and hazardous wastes using any technology—**including but not limited to traditional incinerators, cement kilns, refuse-derived fuel systems, waste-to-energy plants, other industrial burners or any other analogous methods** —which process **results in the emission** of poisonous and toxic fumes, is hereby prohibited.

The prohibition shall not cover the following:

1. Traditional small-scale method of community/neighborhood sanitation "siga";
2. Traditional, agricultural, cultural, health, and food preparation; and
3. Crematoria.

xxx"

SECTION 2. Separability Clause – If any provision or section of this Act is held to be unconstitutional or invalid, the other provisions or sections

hereof, which are not affected thereby shall continue to be in full force and effect.

SECTION 3. Repealing Clause – All laws, orders, issuances, circulars, rules, and regulations or parts, thereof, which are inconsistent with the provisions of this Act, are hereby repealed or modified accordingly.

SECTION 4. Effectivity – This Act shall take effect fifteen (15) days following its publication in at least two (2) newspapers of general circulation of the Official Gazette.

BIBLIOGRAPHY

PRIMARY SOURCES

CONSTITUTION

The 1987 Constitution of the Republic of the Philippines

CODES AND STATUTES

Philippine Environmental Policy, Presidential Decree 1151 (1979).

An Act to Control Toxic Substances and Hazardous and Nuclear Wastes, Providing Penalties for Violations Thereof, and for Other Purposes [Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990], Republic Act No. 6969 (1990).

An Act Providing for a Comprehensive Air Pollution Control Policy and for Other Purposes [Clean Air Act of the Philippines], Republic Act No. 8749 (1999).

An Act Providing for an Ecological Solid Waste Management Program, Creating the Necessary Institutional Mechanisms and Incentives, Declaring Certain Acts Prohibited and Providing Penalties, Appropriating Funds Therefor, and for Other Purposes [Ecological Solid Waste Management Act of 2000], Republic Act No. 9003 (2001).

An Act Mainstreaming Climate Change Into Government Policy Formulations, Establishing the Framework Strategy and Program on Climate Change, Creating for This Purpose the Climate Change Commission, and for Other Purposes [Climate Change Act of 2009], Republic Act No. 9729 (2009).

An Act Institutionalizing the Extended Producer Responsibility on Plastic Packaging Waste, Amending for This Purpose Republic Act No. 9003, Otherwise Known as the "Ecological Solid Waste Management Act of 2000" [Extended Producer Responsibility Act of 2022], Republic Act No. 11898 (2022).

Office of the President, Providing for the Reorganization of the Department of Environment, Energy and Natural Resources, Renaming It as the

Department of Environment and Natural Resources, and for Other Purposes, Executive Order No. 192, series of 1987 [E.O. No. 192, s. 1987].

Instituting the "Administrative Code of 1987" [ADMIN CODE], Executive Order No. 292 (1987).

LOCAL CASES

Bermon Marketing Communication Corporation v. Spouses Yaco, 897 Phil. 810 (2021).

Dela Cruz et. al v. Meralco, 889 Phil. 659 (2020).

Imbong v. Ochoa, G.R. No. 204819, 721 SCRA 147 (2014).

International Service v. Greenpeace, 791 Phil. 243 (2016).

MMDA v. Jancom Environmental Corp. et al., G.R. No. 147465, 375 SCRA 320 (2002).

Oposa v. Factoran, G.R. No. 101083, 224 SCRA 792 (1993).

Osmeña v. Garganera, 828 Phil. 560, 573 (2018).

Republic v. Orbecido III, 509 Phil. 108 (2005).

Zomer Development Company v. Special Twentieth Division of the Court of Appeals, 868 Phil. 93 (2020).

EXECUTIVE AND ADMINISTRATIVE ISSUANCES

Department of Environment and Natural Resources, Guidelines on the Use of Alternative Fuels and Raw Materials in Cement Kilns Department, Department Administrative Order No. 2010-06 (Mar. 12, 2010).

IMPLEMENTING RULES AND REGULATIONS

Department of Environment and Natural Resources, Rules and Regulations Implementing the Philippine Clean Air Act of 1999, Republic Act 8759 (2000).

Department of Environment and Natural Resources, Rules and Regulations Implementing the Extended Producer Responsibility Act of 2022, Republic Act No. 11898 (2023).

CONGRESSIONAL RECORDS

S. REC., Vol. 36, No. 26, 11th Cong.,1st Reg Sess. (October 13, 1998).

S. REC., Vol. 111, No. 91, 11th Cong.,1st Reg Sess. (May 12, 1999).

S. REC., Vol. 112, 11th Cong.,1st Reg Sess. (May 13, 1999).

RULES OF PROCEDURE

RULES OF PROCEDURE FOR ENVIRONMENTAL CASES, A.M. No. 09-6-8-SC (April 3, 2010).

SECONDARY AUTHORITIES

BOOKS AND COMMENTARIES

GREGORIO RAFAEL P. BUETA, PROCESS ENGINEERED FUEL – FUEL PRODUCT OR PLASTIC WASTE EXPORT IN DISGUISE? (2022).

JANE BREMMER, AUSTRALIAN REFUSE-DERIVED FUEL: FUEL PRODUCT OR PLASTIC WASTE EXPORT IN DISGUISE? (2022).

LEE BELL & PROF. HIDESHIGE TAKADA, PLASTIC WASTE MANAGEMENT HAZARDS WASTE-TO-ENERGY, CHEMICAL RECYCLING, AND PLASTIC FUELS (2021).

LESLIE-ANNE-DUVIC-PAOLI, THE PREVENTION PRINCIPLE IN INTERNATIONAL ENVIRONMENTAL LAW 8 (2018).

MAGESWARI SANGARALINGAM, MALAYSIA: REPACKAGED WASTE IMPORTS CASE STUDY OF PROCESSED ENGINEERED FUEL (2022).

MEKONNEN MASCHAL TAREKEGN & EFREM SISAY AKELE, ORGANOCHLORINE DIOXIN AND FURAN EMISSIONS AND ITS MANAGEMENT PRACTICES (2018).

PHILIPPE SANDS ET. AL, PRINCIPLES OF INTERNATIONAL LAW (3d. ed. 2015).

VALEREY DENNY, AN INTRODUCTION TO PLASTICS & TOXIC CHEMICALS HOW PLASTICS HARM HUMAN HEALTH AND THE ENVIRONMENT AND POISON THE CIRCULAR ECONOMY (2022).

YUYUN ISMAWATI ET. AL, REFUSE-DERIVED FUEL IN INDONESIA (2022).

JOURNALS AND OTHER PERIODIC MATERIALS

Angela J. Nagle et al., *A Comparative Life Cycle Assessment Between Landfilling and Co-processing of Waste From Decommissioned Irish Wind Turbine Blades*, J. OF CLEANER PRODUCTION 2020, Volume No. 277.

Afzal Husain Khan et. al, *Municipal Solid Waste Generation and the Current State of Waste-to-energy Potential: State of Art Review,* ENERGY CONVERSION AND MANAGEMENT 115905 (2022).

Dong Lv, et. al, *Effects of Co-Processing Sewage Sludge in the Cement Kiln on PAHs, Heavy Metals Emissions and the Surrounding Environment*, 15 INT'L J. OF ENVTL RESEARCH AND PUBLIC HEALTH 698 (2018).

Lili Yang et. al, *Brominated Dioxins and Furans in a Cement Kiln Co-processing Municipal Solid Waste*, 79 J ENVIRON. SCI., 339 (2019).

Mary Stevens, *The Precautionary Principle in the International Arena*, 2 SUSTAINABLE DEVELOPMENT LAW AND POLICY 13 (2002)

Peter W. Tait et. al, The Health Impacts of Waste Incineration: a Systematic Review, 44 AUSTRALIAN AND NEW ZEALAND J. OF PUBLIC HEALTH 40 (2020).

Qifei Huang et. al, *Potential for Serious Environmental Threats from Uncontrolled Co-processing of Wastes in Cement Kilns*, 46 ENVTL. SCI. TECH. 13031 (2012).

Samuel K. Kirkok et. al, *A Review of Persistent Organic Pollutants: Dioxins, Furans, and Their Associated Nitrogenated Analogues,* S.N. APPLIED SCI., Volume 2, art. number 1729, (2020).

Vorada Kosajan et. al, *Comprehensive Assessment of Cement Kiln Co-processing Under Msw Sustainable Management Requirements*, 174 RESOURCES, CONSERVATION AND RECYCLING 105816 (2021).

Wendell de Queiroz Lamas, Jose Carlos Fortes Palau, Jose Rubens de Camargo, *Waste Materials Co-processing in Cement Industry:*

Ecological Efficiency of Waste, 19 RENEWABLE AND SUSTAINABLE ENERGY REVIEWS 200 (2013).

Xiaoyuan Li et. al, *Emission Characteristics of Dioxin During Solid Waste Co-processing in the Chinese Cement Industry,* 446 J. OF HAZARDOUS MATERIALS (2023).

Zhenzhou Yang et. al, *Characterization of PM10 Surrounding a Cement Plant With Integrated Facilities for Co-processing of Hazardous Wastes*, 186 J. OF CLEANER PRODUCTION 831 (2018).

Zhenzhou Yang et. al, *Investigation of Formation Mechanism of Particulate Matter in a Laboratory-scale Simulated Cement Kiln Co-processing Municipal Sewage Sludge*, 234 J. OF CLEANER PRODUCTION 822 (2019).

NEWS ARTICLES ONLINE

Cemex Drives Significant Impact in Circular Economy, PHIL. DAILY INQ., February 27, 2024, available at https://business.inquirer.net/447542/cemex-drives-significant-impact-in-circular-economy (last accessed February 9, 2025).

Chito Chavez, *DILG: PH Produces 61,000 MT of Garbage Daily; 500 LGUs No Access to Sanitary* Landfills, MANILA BULL., January 28, 2024, *available at* https://mb.com.ph/2024/1/27/ph-produces-61-000-mt-of-garbage-daily-500-lg-us-no-access-to-sanitary-landfills (last accessed August 26, 2024).

Cristina Eloisa Baclig, *Risks Loom as Worsening Garbage Mess Pushes Deep PH Dive Into Waste-to-Energy*, PHIL. DAILY INQ., February 01, 2024, *available at* https://newsinfo.inquirer.net/1897796/for-posting-edited-risks-loom-as-worsening-garbage-mess-pushes-deep-ph-dive-into-wasteenergy (last accessed August 26, 2024).

Dianne Sampang, *MMDA Collects 1,513 Tons of Garbage After Typhoon Carina Onslaught,* PHIL. DAILY INQ., August 6, 2024, *available at* https://newsinfo.inquirer.net/1969997/mmda-collects-1513-tons-of-garbage-after-typhoon-carina-habagat-onslaught (last accessed February 9, 2025).

Elyssa Lopez, *Health, Environment Concerns Raised as PH Cement Plants Burn Plastic Wastes for Fuel*, RAPPLER, August 13, 2022, *available at* https://www.rappler.com/environment/health-concerns-raised-

philippine-cement-plants-burn-plastic-wastes-for-fuel/ (last accessed August 26, 2024).

Jelo Ritzhie Mantaring, *Has the Philippines Created a Garbage Problem Too Big to Dig Its Way Out of?,* PHILIPPINE CENTER FOR INVESTIGATIVE JOURNALISM, May 19, 2024, *available at* https://pcij.org/2024/05/19/has-the-philippines-created-a-garbage-problem-too-big-to-dig-its-way-out-of/ (last accessed February 9, 2025).

Joe Brock, *A Reuters Special Report Trash and Burn Big Brands Stoke Cement Kilns With Plastic Waste as Recycling Falters*, REUTERS, Oct. 28, 2021, *available at* https://www.reuters.com/investigates/special-report/environment-plastic-cement/ (last accessed February 9, 2025)

Marna Dagumboy Del Rosario, *No Waste Segregation, No Disposal at Sanitary Landfills: DENR*, PHIL. NEWS AGENCY, December 16, 2022, *available at* https://www.pna.gov.ph/articles/1190923 (last accessed August 26, 2024).

Solid Waste Segregation Remains Major Challenge in PH: DENR Chief, PHIL. NEWS AGENCY, December 16, 2022, *available at* https://www.pna.gov.ph/articles/1175460 (last accessed August 26, 2024).

INTERNET SOURCES IN GENERAL

Ali Hasanbeigi & Navdeep Bhadbhade, Emissions Impacts of Alternative Fuels Combustion in the Cement Industry, *available at* https://static1.squarespace.com/static/5877e86f9de4bb8bce72105c/t/64940fedcc4f547bb072807d/1687425025095/AF+in+Cement+Industry-6.15.2023.pdf (last accessed August 26, 2024).

Athena Mari E. Son, Just Transition to Low-carbon and Climate Resilient Industries: Waste Management Sector (Institute for Labor Studies 2021 Issue Paper – Waste Management Sector, February 10, 2022), *available at* https://ils.dole.gov.ph/issue-paper/2021-issue-papers/just-transition-to-low-carbon-and-climate-resilient-industries-waste-management-sector (last accessed August 26, 2024).

Cemex Holdings Philippines, Cemex Recognized for Its Waste to Energy Co-processing of Residual Waste, *available at* https://www.cemexholdingsphilippines.com/-/cemex-recognized-for-

its-waste-to-energy-co-processing-of-residual-waste (last accessed August 26, 2024).

Cemex Holdings Philippines, Co-processing for Sustainable Waste Management Solution, *available at* https://www.cemexholdingsphilippines.com/-/co-processing-for-sustainable-waste-management-solution (last accessed February 9, 2025).

Centre for Research on Energy and Clean Air, Estimating the Health & Economic Cost of Air Pollution in the Philippines, available at https://energyandcleanair.org/wp/wp-content/uploads/2023/02/Philippines-Health-Economic-Cost-Report_v2023.pdf (last accessed August 26, 2024).

Commission on Audit, Progress in the Achievement of the Goals of the Ecological Solid Waste Management Act Needs Stronger Support and the Cohesive Efforts and Strategies of All Stakeholders (Performance Audit Report PAO 2023-01, May 2, 2023), *available at* https://www.coa.gov.ph/wpfd_file/solid-waste-management-program-pao-2023-01/ (last accessed August 26, 2024).

EU's Communication on Precautionary Principle (Commission adopts Communication on Precautionary Principle), *available at* https://www.gdrc.org/u-gov/precaution-4.html (last accessed August 1, 2024).

European Bioplastics, Mechanical Recycling, *available at* https://docs.european-bioplastics.org/publications/bp/EUBP_BP_Mechanical_recycling.pdf (last accessed August 26, 2024).

Global Alliance for Incinerator Alternatives, Understanding Refuse Derived Fuel, *available at* https://www.no-burn.org/wp-content/uploads/RDF-Final.pdf (last accessed August 26, 2024).

Global Alliance for Incinerator Alternatives, Garbage Incineration: What a Waste, *available at* https://www.no-burn.org/wp-content/uploads/Garbage-Incineration-What-a-Waste-factsheet.pdf (February 9, 2025)

Global Alliance for Incinerator Alternatives, Zero Incineration, available at https://www.no-burn.org/zero-incineration/ (last accessed February 9, 2025).

Greenpeace Southeast Asia, CP Group's Sustainable Packaging Policy Falls Short in Addressing the Root Cause of Plastic Pollution- Greenpeace Thailand Analysis, available at https://www.greenpeace.org/southeastasia/press/64616/cp-groups-sustainable-packaging-policy-falls-short-in-addressing-the-root-cause-of-plastic-pollution-greenpeace-thailand-analysis/ (last accessed February 9, 2025).

Holcim Philippines, Holcim Reuses Over 1M Tons of Wastes in Cement Manufacturing to Drive Decarbonization, Circularity, *available at* https://www.holcim.ph/holcim-philippines-reuses-over-1m-tons-wastes-cement-manufacturing-drive-decarbonization (last accessed August 26, 2024).

Holcim Philippines, Geocycle Co-processing: A Unique Waste Treatment Solution, *available at* https://www.holcim.com/sites/holcim/files/documents/lafargeholcim_co-processing_geocycle_institutional_brochure.pdf (last accessed February 9, 2025).

International Institute for Sustainable Development, UNGA Recognizes Human Right to Clean, Healthy, and Sustainable Environment, *available at* https://sdg.iisd.org/news/unga-recognizes-human-right-to-clean-healthy-and-sustainable-environment/#:~:text=The%20UN%20General%20Assembly%20(UNGA,and%20sustainable%20environment%20for%20all (last accessed August 26, 2024).

John Vijgen and Dr.Ir. Ron McDowall, Cement Kiln Co-Processing (High Temperature Treatment), *available at* http://www.ihpa.info/docs/library/reports/Pops/June2009/DEFSBC_LogCEMENTKILN_180608_.pdf (February 9, 2025).

Nexus Foundation, Danone's Backed MRF in Jimbaran Turned to Ashes: Waste Management Failure and Negligence in Bali, *available at* https://www.nexus3foundation.org/2024/07/18/press-release-danones-backed-mrf-in-jimbaran-turned-to-ashes-waste-management-failure-and-negligence-in-bali/ (last accessed February 9, 2025).

Republic Cement, Republic Cement Achieves Plastic Neutrality, Offers Co-Processing as EPR Solution, *available at* https://www.republiccement.com/post/republic-cement-achieves-plastic-neutrality-offers-co-processing-as-epr-solution (last accessed August 26, 2024).

Royal Society of Chemistry, Chemical Recycling, *available at* https://www.rsc.org/globalassets/22-new-perspectives/sustainability/progressive-plastics/explainers/rsc-explainer-6---chemical-recycling.pdf (last accessed August 26, 2024).

SourceMaterial, How Plastics Offsetting is Giving Industry a License to Pollute, *available at* https://www.source-material.org/plastic-offsetting-philippines-pcx-verra-cement/ (last accessed August 26, 2024).

Tamara Davison, The Complete Guide to Co-Processing, *available at* https://blog.cleanhub.com/what-is-co-processing#isitenvironmentallyfriendly (last accessed August 26, 2024).

United States Environmental Protection Agency (EPA), Sustainable Materials Management: Non-Hazardous Materials and Waste Management Hierarchy, *available at* https://www.epa.gov/smm/sustainable-materials-management-non-hazardous-materials-and-waste-management-hierarchy (last accessed August 26, 2024).

United States Environmental Protection Agency, Overview of Greenhouse Gases, *available at* https://www.epa.gov/ghgemissions/overview-greenhouse-gases (last accessed August 26, 2024).

United Nations Framework Convention on Climate Change, Philippines Nationally Determined Contribution, *available at* https://unfccc.int/sites/default/files/NDC/2022-06/Philippines%20-%20NDC.pdf (last accessed August 26, 2024).

World Bank, Reducing Plastic Waste in the Philippines: An Assessment of Policies and Regulations to Guide Country Dialogue and Facilitate Action (East Asia and Pacific Region: Marine Plastics Series, 2022), *available at* https://www.pemsea.org/publications/reports/reducing-plastic-waste-philippines-assessment-policies-and-regulations-guide (last accessed August 26, 2024).

World Health Organization, New WHO Global Air Quality Guidelines aim to save millions of lives from air pollution, *available at* https://www.who.int/news/item/22-09-2021-new-who-global-air-quality-guidelines-aim-to-save-millions-of-lives-from-air-pollution (last accessed August 26, 2024).

World Wide Fund For Nature Philippines, Extended Producer Responsibility: a Study on the Role of Producer Responsibility Organizations, 2024,

available at https://wwfph.awsassets.panda.org/downloads/epr-a-study-on-the-role-of-producer-responsibility-organizations.pdf (last accessed August 26, 2024).

Zero Waste Europe, Sustainable Finance for a Zero Waste Circular Economy, at 30, available at https://zerowasteeurope.eu/wp-content/uploads/2020/11/zero_waste_europe_report_sustainable-finance-for-a-zero-waste-circular-economy_en.pdf (last accessed August 26, 2024).

ZWE Staff, Civil Society Statement on the Practice of Waste Incineration in Cement Kilns, available at https://zerowasteeurope.eu/2016/11/civil-society-statement-on-the-practice-of-waste-incineration-in-cement-kilns/ (last accessed February 9, 2025).

INTERNATIONAL MATERIALS

TREATIES

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, *opened for signature* Mar. 21, 1989, 1673 U.N.T.S. 57.

Paris Agreement to the United Nations Framework Convention on Climate Change, *signed* Apr. 22, 2016, T.I.A.S. No. 16-1104.

Stockholm Convention on Persistent Organic Pollutants, opened for signature May 22, 2001, 2256 U.N.T.S. 119.

U.N. Conference on Environment and Development, *Rio Declaration on Environment and Development,* U.N. Doc. A/CONF.151/26/Rev. I (Vol. I) (August 12, 1992).

INTERNATIONAL LAW CASES

Pulp Mills on the River Uruguay (Arg. v. Uru.), Judgement, ¶101 (Apr. 20, 2010), *available at* https://www.icj-cij.org/sites/default/files/case-related/135/135-20100420-JUD-01-00-EN.pdf (last accessed August 26, 2024).

RESOLUTIONS & DECISIONS

The Human Right to a Clean, Healthy and Sustainable Environment, G.A. Res. 76/300, U.N. Doc. A/RES/76/300 (July 28, 2022).

REPORTS & OTHER INTERNATIONAL MATERIALS

Report of the Special Rapporteur on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy and Sustainable Environment, *Right to a Healthy Environment: Good Practices,* at 5-18, Human Rights Council, U.N. Doc. A/HRC/43/53 (Dec. 30, 2019) (by David R. Boyd).

Special Rapporteur on the Human Right to a Clean, Healthy and Sustainable Environment, *The Right to a Healthy Environment: A User's Guide*, at 8, U.N. Doc A/HRC/RES/55/2 (Apr. 22, 2024) (by David R. Boyd).