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*Via Regulations.gov (EPA-HQ-OAR-2025-0068)*

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Natural Resources Division (E243-05)  
Office of Clean Air Programs  
U.S. Environmental Protection Agency  
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Re: Comments of the Plastics Industry Association (PLASTICS)  
Removing Pyrolysis Units from the Definition of “Municipal Waste Combustion Unit,” 91  
Fed. Reg. 13,543 (Mar. 20, 2026), Dkt No. EPA-HQ-OAR-2025-0068

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Dear Ms. Nie:

The Plastics Industry Association (“PLASTICS”) appreciates the opportunity to provide comments on EPA’s proposed revisions to the definition of “municipal waste combustion unit” in the New Source Performance Standards (“NSPS”) and Emission Guidelines (“EG”) for Other Solid Waste Incineration Units (“OSWI”), 40 C.F.R. 60 Subparts EEEE and FFFF, to remove the reference to “pyrolysis/combustion units” at 40 C.F.R. § 60.2977 and § 60.3078, respectively.<sup>1</sup>

PLASTICS is the only organization that supports the entire plastics supply chain, representing nearly one million workers, and driving 1.71 million U.S. jobs across the economy, in a \$551 billion U.S. industry. For nearly three decades, the plastic industry has outpaced overall manufacturing in employment, real shipments and real value added, driven by the versatility of this comparatively new material.<sup>2</sup> The manufacture and use of any material has an environmental footprint. Advanced recycling through technologies such as plastic pyrolysis is an integral part in the industry’s goals to reduce that footprint through increasing circular pathways for post-use plastic materials, recapturing the embedded value of those materials, and avoiding less desirable environmental outcomes such as landfilling or incineration. Further, PLASTICS and its members

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<sup>1</sup> *Standards for Air Curtain Incinerators That Only Burn Wood Wastes, Yard Wastes and Clean Lumber; Provision for Commercial and Industrial Solid Waste Incineration Units: Temporary Use Incinerators and Air Curtain Incinerators Used in Disaster Recovery*; Proposed Rule, 91 Fed. Reg. 13,543 at 15,553 (March 20, 2026) (“Request for Comment on Revising the Definition of “Municipal Waste Combustion Unit” in OSWI NSPS and EG”).

<sup>2</sup> Plastics Industry Association, *Size and Impact Report*, September 2025. Available at <https://www.plasticsindustry.org/wp-content/uploads/2025/08/Size-Impact-Executive-Summary-2025.pdf>.

have a specific interest in fair and reasonable regulation of advanced recycling technologies on par with the regulation of other hydrocarbon manufacturing industries with which they compete.

Plastic is an integral part of modern society, fulfilling a wide range of environmental, health, safety, and security functions that few other materials can match. Their versatility enables lighter vehicles, cleaner water, safer hospitals, more affordable food and more energy-efficient buildings. These benefits touch virtually every aspect of daily life. Whether it is lightweighting vehicles and aircraft to improve fuel efficiency and meet emissions standards, creating sterile packaging for life-saving medications, ensuring the safety of our nation's food supply, or providing temporary shelters in post-disaster situations, plastic materials have a long and proven track record for meeting vital societal needs in ways that are difficult or impossible to replace. In the medical field alone, plastics used in face masks, gloves, hospital gowns, syringes, blood bags, and IV systems play a critical role in reducing contamination risks, while advanced polymers are used to replicate parts of the human body for joint replacements, vascular stents, and reconstructive surgery. Beyond medicine, plastic foam insulation helps regulate indoor temperatures, reduce energy use, and increase the affordability of home heating and cooling utilities. These examples all demonstrate the contributions of plastics that span both everyday life and cutting-edge technology.

PLASTICS and its members recognize the significant stewardship responsibility that comes with producing materials so deeply woven into the fabric of modern life. That responsibility demands a commitment to sustainability, the development of practical circular plastic economy pathways, and a concerted effort to keep plastic waste out of the environment. Achieving these goals requires a comprehensive, "all of the above" approach to recycling and materials recovery — one that embraces a range of tools, from mechanical recycling to advanced recovery methods. Equally important is a stable and clear regulatory environment that empowers, rather than constrains innovation. The removal of regulatory uncertainty will help industry to scale technologies needed to meaningfully increase material recovery rates and advance the circular approaches that society increasingly demands.

Increasing the recovery of plastics is good for American families, the U.S. economy and national sustainability and circularity goals. According to a recent analysis, if 50% of plastics in municipal solid waste streams were diverted from landfills to mechanical and advanced recycling, it would translate into more than 173,000 jobs with an annual payroll of \$12.8 billion. It also would result in \$48.7 billion in annual U.S. economic input.<sup>3</sup> Post-use plastic is a valuable, untapped resource.

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<sup>3</sup> *The Economic Impact of Plastics Recycling: Jobs, Output, and Opportunity from Expanding U.S. Recycling Infrastructure*, American Chemistry Council, November 2025. Available at <https://www.prnewswire.com/news->

To that end, PLASTICS strongly supports EPA's proposed revisions to the OSWI New Source Performance Standards ("NSPS") and Emissions Guidelines ("EG") to remove plastic pyrolysis from their scope for the same reasons first articulated by the Agency in its 2020 proposed rule<sup>4</sup> — as an engineering matter, pyrolysis does not involve incineration or combustion of the feedstock, therefore pyrolysis units are not incineration units subject to any Clean Air Act section 129 standards.<sup>5</sup> In these comments, PLASTICS reiterates and expands on its support for this principle as discussed in its December 2021 comments to the Agency on this topic.<sup>6</sup>

## SUMMARY OF COMMENTS

1. Plastic pyrolysis should be removed from regulation under any CAA § 129 incinerator standards because pyrolysis is not a combustion or incineration process. The best interpretation of the statute is that regulation of non-combustive, thermal conversion processes is improper under CAA section 129;
2. Pyrolysis is more appropriately regulated outside of section 129;
3. The characterization of plastic feedstock used in pyrolysis as a waste or as a "non-waste" is not determinative of whether a unit is subject to CAA section 129; however, at the point of use, plastic feedstock used for pyrolysis is a recovered material rather than solid waste;
4. Pyrolysis, and other advanced recycling technologies, recover valuable materials and are essential to achieving sustainability and circularity goals.

## BACKGROUND

Pyrolysis is an endothermic thermal conversion process in which plastic feedstock materials are heated in the absence of oxygen, typically at temperatures ranging from between 400 and 800° C. Since oxygen is excluded, the material does not combust. Instead, thermal cracking breaks down polymer chains into smaller hydrocarbon fractions. The primary resulting product

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releases/expanding-plastics-recycling-could-support-nearly-50-billion-in-annual-economic-output-and-thousands-of-us-jobs-302596364.html.

<sup>4</sup> *Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Other Solid Waste Incineration Units Review*; Proposed Rule, 85 FR 54,178 at 54,187 (Aug. 31, 2020).

<sup>5</sup> Clean Air Act (CAA) section 129, 42 U.S.C. § 7429, requires EPA to issue NSPS for solid waste incineration units in lieu of emissions standard under CAA section 112(d), 42 U.S.C. § 7412(d), establishing maximum achievable control technology (MACT) standards for sources of hazardous air pollutants.

<sup>6</sup> See EPA Document No. EPA-HQ-OAR-2021-0382-0110, Comments of the Plastics Industry Association on the Potential Future Regulation Addressing Pyrolysis and Gasification Units, EPA Dkt. No. EPA-HQ-OAR-2021-0382 (Dec. 22, 2021).

from the pyrolysis reactor is pyrolysis oil.<sup>7</sup> The pyrolysis oil itself then serves as an intermediate<sup>8</sup> in the further manufacture of other chemical intermediaries and feedstocks, from liquids to gasses, as well as valuable, high quality, and virgin plastic monomers that can be used to subsequently produce sterile, food grade or other plastic materials.<sup>9</sup> Importantly, pyrolysis is not designed to destroy materials, and is uniformly recognized in the literature and as an engineering matter as a distinct chemical process, clearly distinguishable from combustion or incineration processes.<sup>10</sup>

In contrast to pyrolysis, incineration is an exothermic process that burns material. It operates at much higher temperatures (1100 to 1500° C) and in the presence of added oxygen. Energy released as part of an incineration process may be captured for electricity or thermal use. As explained in the preamble to its December 2004 proposed rule on OSWI, the Agency states that “[i]ncineration units are designed to discard materials by burning them at high temperatures and leaving as little residue as possible.”<sup>11</sup>

Despite this clear distinction, EPA included “pyrolysis/combustion units” in the definition of “municipal waste combustion unit” (“MWC Unit”) as part of the December 2005 final rule establishing OSWI standards.<sup>12</sup> The Agency did not define the term “pyrolysis/combustion units” in the OSWI rule, did not specifically seek public comment on including pyrolysis units within the scope of the rule, and provided no explanation of why the term was included as a MWC Unit beyond the brief statement in the preamble of the final rule that, “pyrolysis/combustion units (two chamber incinerators with a starved air primary chamber followed by an afterburner to complete combustion) within the VSMWC and IWI subcategories are considered OSWI units.”<sup>13</sup> Indeed, this characterization recognizes that pyrolysis is a process separate from combustion and underscores that the Agency did not intend to capture in the waste incineration rule pyrolysis units that produce new products and feedstocks, but rather only intended to capture single processing units that result in “complete combustion” of all feedstocks.<sup>14</sup> Indeed, parallel NSPS for small

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<sup>7</sup> Other resulting products may include syngas and bio-char.

<sup>8</sup> See definition of “intermediate” at 40 C.F.R. § 720.3.

<sup>9</sup> Al-Haj Ibrahim, Hassan. (2020). Introductory Chapter: Pyrolysis, pp. 1-2. 10.5772/intechopen.90366.

<sup>10</sup> See, e.g., Mamta Devi, Sachin Rawat, Swati Sharma, A comprehensive review of the pyrolysis process: from carbon nanomaterial synthesis to waste treatment, *Oxford Open Materials Science*, Volume 1, Issue 1, 2021, itab014, <https://doi.org/10.1093/oxfmat/itab014>.

<sup>11</sup> *Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Other Solid Waste Incineration Units*; Proposed Rule, 69 Fed. Reg. 71,481 (Dec. 9, 2004)).

<sup>12</sup> *Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Other Solid Waste Incineration Units*; Final Rule, 70 Fed. Reg. 74,870 (Dec. 16, 2005).

<sup>13</sup> *Id.* at pp. 74876-77.

<sup>14</sup> Accord 40 C.F.R. 60.1465 (NSPS for Small Municipal Solid Waste incinerators; definitions; “Pyrolysis/combustion unit means a unit that produces gases, liquids, or solids by heating municipal solid waste.

municipal waste combustors already include an *express exemption for plastics pyrolysis recovery* and recycling units, see footnote for additional details.<sup>15</sup>

In the years following promulgation of the 2005 final rule, EPA received numerous inquiries regarding the applicability of EPA's OSWI rule to pyrolysis units. Acknowledging that there was "considerable confusion in the regulated community regarding the reference to pyrolysis/combustion units in the definition of MWC unit," EPA proposed to remove the reference to pyrolysis in the MWC Unit definition in August 2020.<sup>16</sup> The Agency received significant public comments on the August 2020 proposal and in response, issued an Advanced Notice of Proposed Rulemaking ("ANPRM") in September 2021 requesting broad, additional information on advanced recycling generally to assist with the consideration of removing the reference to pyrolysis from the MWC Unit definition,<sup>17</sup> which was subsequently withdrawn in May 2023.<sup>18</sup> EPA now has the opportunity to rectify significant confusion and misclassification of pyrolysis that has spanned over two decades. For the reasons provided in this comment document, PLASTICS urges EPA to correct the definition of MWC Unit in the Agency's final rule by removing references to pyrolysis from the definition of MWC Unit in OSWI. Doing so would align the rule with the best reading of section 129 of the CAA.

## DISCUSSION

### 1. The Best Reading of Section 129 Excludes Pyrolysis Units from the Definition of MWC Unit

EPA should remove the reference to pyrolysis/combustion unit from the definition of "municipal waste combustion unit" in the OSWI NSPS and EG because pyrolysis does not involve incineration or combustion. Therefore, pyrolysis units are not incineration units subject to CAA section 129 incinerator standards. Section 129 applies only to "solid waste incineration units

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*The gases, liquids, or solids produced are combusted and the emissions vented to the atmosphere*(emphasis added).

<sup>15</sup> See 40 C.F.R. § 60.1940 (definition of "Municipal waste combustion unit" exempting pyrolysis or combustion units located at a plastics or rubber recycling units, which are in turn defined at 40 C.F.R. § 60.1465 in relevant part as "integrated processing unit[s] for which plastics ... are the only feed materials" and the pyrolysis products are "marketed to become input feed stock for chemical plants or petroleum refineries").

<sup>16</sup> Supra note 4 at p. 54,188.

<sup>17</sup> *Potential Future Regulation Addressing Pyrolysis and Gasification Units*; Proposed Rule, 86 Fed. Reg. 50,296 (Sept. 8, 2021).

<sup>18</sup> *Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Other Solid Waste Incineration Units Review; Withdrawal of Proposed Provision Removing Pyrolysis/Combustion Units*; Proposed Rule, 88 Fed. Reg. 36,524 (June 5, 2023).

*combusting* commercial or industrial waste.”<sup>19</sup> In turn, a “solid waste incineration unit” is defined as an “operating unit of any facility which *combusts* any solid waste material from commercial or industrial establishments or the general public.”<sup>20</sup> That a unit “combusts” waste material is the only applicability criterion under the statute and is unambiguous.<sup>21</sup> Accordingly, because pyrolysis does not involve “combustion,” pyrolysis units are outside the scope of section 129, and references to pyrolysis units must be removed from the OSWI NSPS and EGs. This is the “best” and, in fact, the *only* permissible reading of the statute.

As EPA recognized in its August 2020 proposal seeking to remove pyrolysis/combustion units from the definition of MWC Unit, the pyrolysis process is endothermic and does not require the addition of oxygen.<sup>22</sup> To the contrary, the pyrolysis process is dependent upon an absence of oxygen inside the reactor unit.<sup>23</sup> Based in part on this understanding and acknowledging that the pyrolysis process is not combustion, EPA’s August 2020 proposal correctly concluded that pyrolysis/combustion unit should not be referenced in the definition of MWC Unit for the purposes of the OSWI rule.<sup>24</sup> Consistent with this rationale, the Agency should remove references to pyrolysis from the OSWI rule and decline to regulate pyrolysis units under section 129 of the Clean Air Act.

The seminal U.S. Supreme Court case on permissible agency interpretations of statutes reinforces this conclusion. In *Loper Bright Enterprises v. Raimondo*, the Court held that agency actions must reflect the best reading of a statute.<sup>25</sup> Moreover, federal courts have consistently interpreted the phrase, “any facility which combusts any solid waste” as clear and unambiguous, in contrast to other provisions of section 129 found to be ambiguous.<sup>26</sup> Here, the plain language of the statute *clearly* and *unambiguously* provides that the authority granted to EPA in section 129 applies only to the regulation of solid waste *incineration* units that *combust* industrial or municipal

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<sup>19</sup> 42 U.S.C. § 7429(a)(1)(D) (emphasis added).

<sup>20</sup> 42 U.S.C. § 7429(g)(1) (emphasis added).

<sup>21</sup> Notably, in EPA’s 2005 final rule establishing the OSWI standards, the Agency distinguishes industrial and declines to regulate as MWC Units, boilers whose primary function is combustion of waste for energy recovery. Rather, EPA determined that these units are addressed under section 112 of the CAA. *Supra* note 12 at page 74,876.

<sup>22</sup> *Supra* note 4 at pages 54187-88.

<sup>23</sup> *Supra* note 10.

<sup>24</sup> *Supra* note 22.

<sup>25</sup> 144 S. Ct. 2244, 2266 (2024).

<sup>26</sup> *E.g.*, concerning which waste material sources are covered under “from . . . the general public.” *National Ass’n of Clean Water Agencies v. E.P.A.*, 734 F.3d 1115, 1128 (D.C. Cir. 2013) (citing *Natural Resources Defense Council v. E.P.A.*, 489 F.3d 1250, 1259—60 (D.C. Cir. 2007)).

waste. As pyrolysis does not involve combustion or incineration of waste, it is clearly excluded from regulation under section 129 of the CAA.

EPA's OSWI regulations prescribe standards effectuating section 129 of the CAA, which, as mentioned above, concerns solid incineration units combusting commercial or industrial waste.<sup>27</sup> Neither "combustion" nor "incineration" are defined in the statute and in the absence of statutory definitions, courts often look to the plain meaning of terms. "Combustion" is commonly defined as "the act of burning"<sup>28</sup> and is described in one scientific journal as "the sequence of exothermic chemical reactions between a fuel and an oxidant accompanied by the production of heat and conversion of chemical species."<sup>29</sup> "Incineration" is commonly defined as "the process of burning something completely"<sup>30</sup> and is described in one scientific journal as "a thermal waste treatment technique that can be understood as a controlled combustion process with the primary objective of volume reduction and energy recovery from the waste stream."<sup>31</sup>

In contrast, pyrolysis units apply an endothermic (rather than exothermic) process that does not use an oxidant and does not burn the feedstock. Rather, the aim of pyrolysis is to transform the feedstock into new materials for further use. Thus, pyrolysis involves neither combustion nor incineration as these terms are commonly defined and understood. Accordingly, CAA section 129 cannot be read to grant EPA the authority to regulate plastic pyrolysis under the OSWI rule. This much was acknowledged by EPA in its proposed August 2020 rule.<sup>32</sup> Therefore, the Agency must remove the reference to pyrolysis/combustion units from the definition of MWC Unit in the OSWI NSPS and EG. Anything less would amount to an agency action that clearly falls short of the best reading of section 129.

## 2. Pyrolysis Units Are More Appropriately Regulated Outside of Section 129

Pyrolysis units and new products resulting from post-use plastic feedstock pyrolysis are currently regulated as chemical manufacturing processes rather than combustion or incineration, under existing federal and state laws. Further, removing pyrolysis units from the definition of MWC Unit permits regulation of pyrolysis under other sections of the CAA, such as sections 111

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<sup>27</sup> Supra note 19.

<sup>28</sup> Combustion, Meriam-Webster.com Dictionary.

<sup>29</sup> James G. Speight, Hydrocarbon Combustion, in Handbook of Industrial Hydrocarbon Processes (Gulf Pro. Publ'g 2010).

<sup>30</sup> Incineration, Cambridge.com Dictionary.

<sup>31</sup> Combustion, in Comprehensive Energy Systems (Elsevier 2018).

<sup>32</sup> Supra note 4.

or 112, on the same terms as other processing units in the applicable chemical manufacturing source categories.

In EPA's 2021 ANPRM, the Agency recognized that "pyrolysis units have been used for decades in the *production* of olefins such as ethylene and propylene."<sup>33</sup> Similarly, gasification units have been used for many years in the manufacturing sector. Thus, pyrolysis and gasification are *manufacturing* processes, which have long been viewed as appropriately regulated under CAA sections 111 or 112, if EPA determines that emissions from a given category of sources cause or contribute significantly to air pollution that may reasonably be anticipated to endanger public health or welfare.<sup>34</sup>

For example, depending on the circumstances, the pyrolysis of post-use plastic feedstock might be characterized as a Chemical Manufacturing Process Unit ("CMPU"), a component of the Chemical Manufacturing Area Sources ("CMAS") source category regulated under CAA section 112. Section 112 requires EPA to establish emission standards for each category or subcategory of major sources and area sources of hazardous air pollutants.<sup>35</sup> EPA includes CMAS as a category of area sources and defines "chemical manufacturing process" to include "all equipment which collectively functions to produce a product [compound or chemical which is the intended product of the CMPU] or isolated intermediate," providing that "process" includes "any, all, or a combination of reaction, recovery, separation, purification, or other activity, operation, manufacture, or treatment which are used to produce a product or isolated intermediate."<sup>36</sup> The Agency further prescribes that CMPU includes all process vessels, equipment, and activities necessary to operate a chemical manufacturing process that produces a material or family of materials described by NAICS code 325.<sup>37</sup>

Pyrolysis units involve an endothermic process that results in the production of compounds and/or chemicals used to make plastic materials that are captured under NAICS code 325.<sup>38</sup> Indeed, EPA included "Plastics Materials and Resin Manufacturing" in its October 2009 final rule

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<sup>33</sup> Emphasis added. Supra note 17.

<sup>34</sup> Gasification is similar to pyrolysis in that it involves high temperature, sub-stoichiometric, oxygen-limited processing of a feedstock *without combustion* producing a mix of intermediate gas streams that may be used as chemical manufacturing feedstocks or fuels. Unlike pyrolysis, gasification is conducted in the presence of oxygen, although controlled to prevent combustion.

<sup>35</sup> 42 U.S.C. § 7412(d)(1).

<sup>36</sup> 40 C.F.R. § 63.11502(b).

<sup>37</sup> 40 C.F.R. § 63.11494(b).

<sup>38</sup> NAICS code 325 includes the manufacturing of plastics material and resins. See <https://www.census.gov/naics/?input=325&year=2022&details=325>.



establishing NESHAPs for several area source categories in the chemical manufacturing sector.<sup>39</sup> Upon a determination that such regulations are necessary, the Agency could initiate a separate rulemaking to establish National Emission Standards for Air Pollutants (“NESHAP”) at 40 C.F.R. Part 63, Subpart VVVVVV for any hazardous air pollutants resulting from the pyrolysis of post-use plastic feedstock not already captured in the regulations. Section 111 of the CAA also provides the Agency with the authority to regulate potential emissions through the establishment New Source Performance Standards (“NSPS”) for pyrolysis units, which apply to new sources and reflect the maximum emission limitation achievable through application of the best system of emission reduction (“BSER”) available, in a separate rulemaking. PLASTICS believes that gasification other advanced recycling technologies that produce new chemicals should be regulated on par with comparable chemical manufacturing source categories rather than under section 129 incineration standards.

PLASTICS further calls the Agency’s attention to the increasing number of states that already regulate pyrolysis as advanced recycling technology, which is a subcategory of manufacturing.<sup>40</sup> Indeed, at present, at least 25 states explicitly define or describe pyrolysis as a manufacturing process in regulation or statute.<sup>41</sup> The characterization of pyrolysis as a manufacturing process at both the state and federal level is consistent with PLASTICS’ position that regulation of pyrolysis under section 129 is inappropriate.

During an April 6, 2026, virtual public hearing on this proposal held by EPA’s Office of Clean Air Programs, some participants expressed concern about removal of pyrolysis from the definition of MWC Unit, largely focusing on the potential release of emissions to the environment and exposures to surrounding communities. PLASTICS and its members believe these concerns, if warranted, are more appropriately addressed through regulation designed for such activities under other sections of the CAA, such as Sections 111 or 112, which have historically achieved significant reductions of air emissions, resulting in protection of the environment and human health.

In summary, pyrolysis of post-use plastics are already regulated as a manufacturing process through various mechanisms Should EPA make the necessary finding that emissions from

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<sup>39</sup> *National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources*; Final Rule, 74 Fed. Reg. 56,008 (Oct. 29, 2009).

<sup>40</sup> *See, e.g.*, Fla. Stat. § 403.703, LA Rev Stat § 30:2153, Mich. Comp. Laws Ann. § 324.11502, Arizona Rev. Stat. § 49-701, 27A Oklahoma Stat. § 2-10-103.

<sup>41</sup> For example, Kan. Stat. Ann. § 65-3402(ff)(1) defines “advanced recycling” as a manufacturing process and includes pyrolysis and gasification as advanced recycling processes. Similarly, Mich. Comp. Laws Ann. § 324.11502(21) describes “chemical recycling” as a manufacturing process and includes pyrolysis and gasification as chemical recycling processes.

pyrolysis cause or contribute significantly to air pollution that may reasonably be anticipated to endanger public health or welfare, the Agency could initiate regulatory actions under sections of the CAA focused on manufacturing activities, including addressing the types of concerns raised by stakeholders during EPA's virtual hearing. Restrictions currently imposed by EPA under section 129 of the CAA are not appropriate for pyrolysis of post-use plastic feedstock and EPA's inclusion of pyrolysis units in the MWC Unit definition has caused considerable confusion, resulting in a chilling effect. This has deterred industry from making infrastructure investments to scale up and commercialize this technology, which has an important role to play in increasing circularity and material efficiency and strengthening U.S. recycling systems, alongside other policy measures to reduce plastic pollution to the environment, as described in greater detail in Section 4.

### 3. EPA Should Reject Arguments Characterizing Feedstock as "Solid Waste"

The question of whether plastic feedstock used for pyrolysis is characterized as a "solid waste" or as a non-waste is immaterial to EPA's determination of whether pyrolysis units may be regulated under CAA section 129 for the reasons discussed above – pyrolysis is not combustion. Notwithstanding this point, EPA should reject any arguments that post-use feedstock is "solid waste." Whatever its original source, at the time the feedstock is put through the pyrolysis process unit, it consists of valuable recovered materials used in lieu of virgin petroleum feeds. It is transformed into new chemicals indistinguishable in function from the same chemical produced with traditional feedstocks.

In response to EPA's previous August 2020 proposed rule and September 2021 ANPRM, some commenters raised the point that plastic pyrolysis feedstocks fall within the definition of "solid waste" under the Resource Conservation and Recovery Act (RCRA) in an attempt to argue that pyrolysis is appropriately regulated under the OSWI rule.<sup>42</sup> However, EPA's RCRA regulations make clear that the administrative definition of "solid waste" in the regulations applies "*only* to wastes that also are hazardous for purposes of the regulations implementing subtitle C of RCRA."<sup>43</sup> As a result, the details of the RCRA regulatory definition are designed to identify management standards for hazardous wastes and are not relevant to assessing the status of non-hazardous used plastic. Nevertheless, even in the RCRA context, Congress is clear that valuable, useable materials are often mixed with solid waste, and that these usable materials are distinguishable from and can

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<sup>42</sup> 42 U.S.C. § 6903, 40 C.F.R. § 261.2.

<sup>43</sup> See 40 CFR § 261.1(b)(1) ("The definition of solid waste contained in this part applies only to wastes that also are hazardous for purposes of the regulations implementing subtitle C of RCRA. For example, it does not apply to materials (such as non-hazardous scrap, paper, textiles, or rubber) that are not otherwise hazardous wastes and that are recycled").

and should be separated from and recovered from solid waste streams to avoid “needless [...] burial.”<sup>44</sup>

While PLASTICS emphasizes that pyrolysis units do not involve combustion or incineration and therefore, should not be regulated under section 129 of the CAA regardless of the meaning of “solid waste,” EPA should look to its CAA regulations (rather than RCRA) to understand how this term is used in section 129. Solid waste is defined at 40 C.F.R. §§ 60.2977, 60.3078 as,

Any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, agricultural operations, and from community activities [...].

Under EPA’s CAA definition, post-use plastic feedstock used *for pyrolysis*, or other advanced recycling processes, is not solid waste, as it is not garbage, refuse, or other discarded material. Rather, at the time the pyrolysis process begins, the post-use plastics are feedstocks which are recovered material.<sup>45</sup> Because the materials that compose post-use plastic feedstocks used for pyrolysis are not “discarded” but rather, are useable, “recovered materials,” the feedstocks do not meet EPA’s definition of “solid waste” at 40 C.F.R. §§ 60.2977, 60.3078.

4. Pyrolysis, and Other Advanced Technologies, Help Meet Important Sustainability, Recycling, and Material Recovery Goals

Removing pyrolysis from the definition of MWC Unit is important for encouraging investment in advanced recycling technologies, which provide circular pathways that capture ongoing economic value from these materials, reintegrate material inputs into new value chains and, in doing so, tackle several pressing environmental concerns such as increased demand for sustainability and for recycling and recycled content in products and avoiding unnecessary landfilling or incineration of materials.

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<sup>44</sup> See 42 U.S.C. § 6901(c) (“Materials. The Congress finds with respect to materials, that— (1) millions of tons of recoverable material which could be used are needlessly buried each year; (2) methods are available to separate usable materials from solid waste; and (3) the recovery and conservation of such materials can reduce the dependence of the United States on foreign resources ...”).

<sup>45</sup> In the absence of a definition of “recovered materials” in EPA’s regulations at 40 C.F.R. Part 60, Subparts EEEE and FFFF, the Agency may look to other EPA environmental programs for guidance on the meaning of the term. EPA’s regulation at 40 C.F.R. § 247.3 prescribes that recovered materials means “waste materials and byproducts which have been recovered or diverted from solid waste...” and provides that postconsumer materials, including paper, paperboard, and fibrous wastes that enter and *are collected from municipal solid waste*, are recovered materials in the context of paper and paper products. (Emphasis added).

As described by EPA in its National Strategy to Prevent Plastic Pollution, “circular economy reduces materials use, redesigns materials to be less resource intensive, and recaptures “waste” as a resource that can serve as feedstock to manufacture new materials and products.”<sup>46</sup> Circular manufacturing approaches keep products, materials, and resources in use for as long as possible, diverts valuable plastics from landfills, optimizes resources efficiency, and reduces waste. According to the U.S. Environmental Protection Agency’s Office of Land and Emergency Management (“OLEM”), in 2018 only 9% of plastic waste generated in the U.S. municipal solid waste stream was mechanically recycled.<sup>47</sup> Moreover, a 2017 report from the Ellen MacArthur Foundation estimated that 95 percent of material value from plastic packaging alone, or \$80 billion to \$120 billion, is lost annually because the material is used and disposed of in a short time-period.<sup>48</sup> Increased use of pyrolysis and other advanced recycling technologies for processing plastic feedstock fill a critical need within the plastics recycling value chain to keep otherwise-discarded plastic materials in economically productive manufacturing loops.

In addition to materials recovery and improving circularity, a robust market for recovered, useable plastic will provide real incentives to reduce domestic and global mismanagement of plastic waste and losses to the environment, including the marine environment. To that end, a 2020 report prepared by Pew Charitable Trust and SYSTEMIQ examined measures needed to achieve an 80% reduction of land-based sources of plastic pollution to the marine environment compared to their “business as usual” levels projected to accumulate by 2040. The report states that, “it is not the lack of technical solutions that is preventing us from addressing the ocean plastic crisis, but rather inadequate regulatory frameworks, business models, and funding mechanisms. Although the technical solutions exist, the incentives are not always in place to scale up these changes fast enough.”<sup>49</sup> The report identified mechanical open loop, mechanical closed loop and chemical plastic-plastic recycling all as recycling methods that could achieve approximately 99 million metric tons of reductions globally on an annual basis.<sup>50</sup> The report further emphasizes the urgency

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<sup>46</sup> U.S. EPA, National Plastics Recycling Strategy: A Circular Economy for All, November 2024 (EPA 530-R-24-006).

<sup>47</sup> U.S. Env’tl. Prot. Agency, *Final National Strategy to Prevent Plastic Pollution* (2024), available at [https://www.epa.gov/system/files/documents/2024-11/final\\_national\\_strategy\\_to\\_prevent\\_plastic\\_pollution.pdf](https://www.epa.gov/system/files/documents/2024-11/final_national_strategy_to_prevent_plastic_pollution.pdf).

<sup>48</sup> *The New Plastics Economy: Rethinking the future of plastics and catalysing action* (Nov. 30, 2017), available at <https://www.ellenmacarthurfoundation.org/the-new-plastics-economy-rethinking-the-future-of-plastics-and-catalysing>.

<sup>49</sup> Pew Charitable Trust and SYSTEMIQ, *Breaking the Plastic Wave Thought Partners A Comprehensive Assessment of Pathways Towards Stopping Ocean Plastic Pollution* (2020), available at [https://www.pew.org/-/media/assets/2020/07/breakingtheplasticwave\\_report.pdf](https://www.pew.org/-/media/assets/2020/07/breakingtheplasticwave_report.pdf).

<sup>50</sup> *Id.*

of removing regulatory barriers to scale up recycling infrastructure and deliver solutions that reduce plastic waste.<sup>51</sup>

Increased uptake of pyrolysis, gasification, and other advanced recycling processes are complementary technical solutions for existing mechanical plastic recycling capabilities. While the scope of EPA's current proposed rule and request for comment is limited to pyrolysis, it is important to note that other advanced recycling technologies such as gasification,<sup>52</sup> fill an existing and critical gap in processing complex plastic materials into virgin, high quality recycled content that can be used in sensitive applications such as food contact and healthcare. Its primary output synthesis gas (syngas) is a valuable chemical feedstock, not a waste product. Investment and commercialization in advanced recycling will help to strengthen the overall plastic materials recycling ecosystem and avoid less desirable environmental outcomes such as incineration or landfilling these materials.

Pyrolysis and other advanced recycling processes can also feasibly be used to recover a broader range of materials than are typically recycled mechanically such as certain mixed plastics or other hard-to-recycle materials, like films and flexible packaging. For example, while there are currently no effective, commercial technologies available to recycle certain components of wind energy infrastructure, a report by the U.S. Department of Energy ("DOE") concluded that with the increased use of recyclable resin, pyrolysis could be an effective, environmental and economic recycling solution for wind turbine blades.<sup>53</sup>

Consumers have become increasingly concerned about their environmental footprint and are demanding more sustainable products and packaging from companies. In 2024, PwC's Voice of Consumer Survey ("PwC Survey") found that consumers are willing to pay a 9.7% premium on sustainable products.<sup>54</sup> Recyclability is an important aspect of sustainability<sup>55</sup> for consumers and 75% of consumers are more likely to buy from companies that use recycled materials in packaging

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<sup>51</sup> *Id.*

<sup>52</sup> See note 34, above.

<sup>53</sup> Department of Energy (DOE), *Recycling Wind Energy Systems in the United States, Part 1: Providing a Baseline for America's Wind Energy Recycling Infrastructure for Wind Turbines and Systems, Research, Development, and Demonstration Needs, Gaps, and Opportunities* (Jan. 2025), available at <https://docs.nrel.gov/docs/fy25osti/87970.pdf>.

<sup>54</sup> PwC, Voice of the Consumer Survey (May 15, 2024), available at <https://www.pwc.com/gx/en/issues/c-suite-insights/voice-of-the-consumer-survey/2024.html>.

<sup>55</sup> Ipsos survey on behalf of Stena Recycling, *Circular Voice – Times of Change*, May 2024

or products.<sup>56</sup> The PwC Survey also reported that 50% of the businesses said it was “very” or “critically” important for their brand to be linked with recycling and sustainability.<sup>57</sup> The amount of actual or attributed plastic monomers manufactured using advanced recycling processes can be tracked using transparent and auditable accounting standards that are verified through third-party certification<sup>58</sup> to help meet these consumer demands.

The demand for more sustainable and circular use of materials, including plastics, is not theoretical information in a survey result. It is evident in policy actions and market responses in the United States and abroad.

The drive for increases in sustainability and recycling can be seen in the proliferation of legislation around these issues. Leaving aside the merits of any particular bill and whether it would increase sustainability or recycling, the amount of policy focus on these issues is quite high. For example, extended producer responsibility (“EPR”) proposals have rapidly increased in the United States since 2021.<sup>59</sup> Sub-nationally, States that have passed EPR laws include California, Colorado, Maine, Minnesota, Oregon, and Washington, while Hawaii, Illinois, Massachusetts, Michigan, New Hampshire, New York, New Jersey, Rhode Island, and Tennessee have considered EPR legislation.

According to a recent market analysis, globally, the primary driver for the growing worldwide pyrolysis oil market is an increased focus on circular and sustainable policies. This market is experiencing significant annual growth.<sup>60</sup> At present, the Asia-Pacific and Europe regions hold the largest shares of this market, with China, Germany and the United Kingdom being the largest countries within their regions making pyrolysis oil from post-use plastic materials. North America comes in as only the third largest regional market player.<sup>61</sup> Likewise, capital investment decisions for gasification-based advanced recycling facilities in the U.S. are being made now but face the chilling effect of regulatory ambiguity due to CAA section 129 confusion. Gasification and

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<sup>56</sup> Waste Management, *Recycling Report: Opportunities to Improve Recycling with Education, Access and Investment* (Nov. 2024), available at <https://www.wm.com/content/dam/wm/assets/recycle-right/america-recycles-day/2024-recycling-report.pdf>.

<sup>57</sup> Supra note 54.

<sup>58</sup> 4 Kathryn Beers et al., *An Assessment of Mass Balance Accounting Methods for Polymers Workshop Report*, NIST SP 1500-206 (National Institute of Standards and Technology (U.S.), 2022), NIST SP 1500-206, <https://doi.org/10.6028/NIST.SP.1500-206>.

<sup>59</sup> Clearyst, *US Extended Producer Responsibility (EPR) Packaging Laws*, (Dec. 2025), available at <https://www.clearyst.com/resources/us-epr-packaging-laws>.

<sup>60</sup> Bhawna Singh, *Global Pyrolysis Oil Market (2025–2031): Trends, Outlook & Forecast*, 6WRESEARCH (Apr. 2025), available at <https://www.6wresearch.com/industry-report/global-pyrolysis-oil-market>.

<sup>61</sup> *Id.*

pyrolysis of post-use plastic is already further along commercially in Europe and Asia, where it is clearly regulated as manufacturing. U.S.-based companies are grappling with regulatory barriers that is pushing investment in circular plastic solutions offshore, directly contrary to the Administration's goal to support U.S. manufacturing and innovation.

The increased demand for sustainability and recycled materials must be met through a combination of policy and investment decisions which include scaling up all types of technology that can help strengthen recycling markets, improve recovery of materials that still maintain economic value, and reduce less desirable outcomes such as landfilling or incineration.

## CONCLUSION

On behalf of PLASTICS, I thank you for considering these comments. We would be pleased to answer any questions or provide additional information.

Respectfully submitted,



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