

ARTICLES

THE CASE FOR A LEGISLATED MARKET IN MINIMUM RECYCLED CONTENT FOR PLASTICS

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SUMMARY

The plastic packaging industry faces mounting shareholder and public pressure to reduce the environmental impact of post-consumer plastic packaging. The recycled plastics market in the United States is positioned for growth; however, developing a reliable supply of post-consumer plastics will be expensive because of problems in the recycling market. Reliance on export markets has limited investment in domestic recycling capacity, local collection programs vary considerably, and many consumers are ignorant about what can be recycled. These challenges are compounded by the current low-cost environment for manufacturing virgin plastics. This Article evaluates the opportunities and challenges of legislating a minimum recycled content requirement for the packaging industry. First, it provides an overview of the current supply chain, analyzes the factors that are driving change in these processes, and describes the current challenges with the recycling market and solutions that have been previously utilized. Next, it proposes a model law solution, and analyzes the benefits and challenges of creating a statutory requirement for a minimum quantity of recycled plastics. Finally, it assesses the possibilities of passing federal and state legislation.

The plastic packaging industry faces mounting shareholder and public pressure to reduce the environmental impact of post-consumer plastic packaging. Improperly discarded plastics devastate marine and terrestrial life. However, packaging industry participants can capitalize on public awareness and brand themselves as good environmental citizens by incorporating more recycled plastic into their goods. These companies face “industry-specific risks,” such as “shifting consumer preferences that include a growing trend in societal demands for increasing levels of . . . environmental protection.”¹

The recycled plastics market in the United States is positioned for growth. China has ceased importing foreign plastics for recycling, creating a surplus of American post-

consumer plastics. However, developing a reliable supply of post-consumer plastics in the current recycling scheme will be expensive because of problems in the recycling market. Reliance on export markets for recycling has limited investment in domestic recycling capacity. Local recycling and waste management collection programs vary considerably. Many consumers are ignorant about what can be recycled, leading to significant plastic contamination. Decontamination is not possible with current recycling technology. As a result, otherwise recyclable plastics are diverted to landfills.

These challenges are compounded by the current low-cost environment for manufacturing virgin plastics, the main competitor for recycled plastics.² As manufactur-

Authors' Note: Special thanks to Prof. Victor B. Flatt for his guidance on this Article.

1. DowDuPont, Annual Report (Form 10-K) (Feb. 11, 2019), https://s23.q4cdn.com/116192123/files/doc_financials/2018/DOWDUPONT-2018-10-K-Final-02.11.19.pdf.

2. ANTHONY PETTINARI ET AL., CITI GLOBAL PERSPECTIVES AND SOLUTIONS, RETHINKING SINGLE-USE PLASTICS: RESPONDING TO A SEA CHANGE IN CONSUMER BEHAVIOR 14 (2018) [hereinafter Citi GPS], <https://ir.citi.com/klrKXyZJnFzVcxKt3M%2B8ZjE95%2B42JwVomCDhiNLwPYpStDlxWT7eLP5gzY382k47r1a%2BFVqkE2U%3D>. While virgin plastics are a direct competitor to recycled plastics, aluminum and glass are plastic packaging substitutes.

ers of plastic packaging seek to incorporate more recycled goods into their products, the higher cost of recycled plastic stock may put these companies at a competitive disadvantage; while goodwill would increase, the production costs of their goods would increase as well, which would increase cost to consumers. Consumers may flock to lower-cost competitors.

This first-mover problem may be solved by lobbying for legislation requiring a certain percentage of recycled plastic in qualifying plastic goods. Though at least one voluntary consensus standard body (VCSB) in packaging is already emerging, a legislative solution would enforce industry participation, leading to quicker environmental benefits from recycled plastics and corporate competition. Further, requiring competitors to engage in minimum recycled content production mitigates the economic risk to any individual plastic packaging manufacturer while creating an opportunity for a tradable quota system. Passing legislation creating an involuntary market for minimum recycled plastic content would assist manufacturers of plastic packaging to achieve recycling goals and consumer goodwill in an efficient manner by either receiving payments for credits and enabling investment in better technology and processing capacity, or paying other companies for credits, thereby avoiding the cost of integrating recycled content into their product packaging.

This Article evaluates the opportunities and challenges of legislating a minimum recycled content requirement for the packaging industry. First, it provides an overview of the current plastics and recycled plastics supply chain, then analyzes the factors that are driving change in these processes. It then describes the current challenges with the recycling market and solutions that have been previously utilized. Next, it proposes a model law solution, in which the benefits and challenges of creating a statutory requirement for a minimum quantity of recycled plastics are analyzed. Finally, it analyzes the possibilities of passing federal legislation and state legislation.

I. Background—Plastic Manufacturing and Recycling Life Cycle

According to Citigroup, 52% of all packaging is made from plastic, and plastic packaging accounts for one-third of plastic resin produced, or about 130 million tons of plastic per year.³ Plastic packaging represents 26% of the volume of all plastic.⁴ Plastics became the material of choice for packaging applications because they are inert, durable, versatile, and lightweight compared with other substitutes, including glass, aluminum, paper, and cloth.⁵

3. *Id.* at 7.

4. ELLEN MACARTHUR FOUNDATION, NEW PLASTICS ECONOMY GLOBAL COMMITMENT: JUNE 2019 REPORT 4 (2019) [hereinafter NPE GLOBAL COMMITMENT], <https://www.newplasticseconomy.org/assets/doc/GC-Report-June19.pdf>.

5. CITI GPS, *supra* note 2, at 11.

Plastic is made from hydrocarbon byproducts. Monomers are the basic building block of plastics, individual molecules that link together to form long chains called polymers. Monomers are formed when hydrogen molecules attach to a carbon backbone. Monomers can be natural or synthetic. Different permutations of carbon, hydrogen, and other elements such as fluorine, nitrogen, oxygen, and sulfur result in polymers with different properties. The process of creating different polymers from monomers is called polymerization.⁶ Polymers can be divided into two categories, thermoset and thermoplastics.⁷ Thermoset polymers degrade but cannot be melted down and recast into different shapes or products.⁸ Polymers that can be heated and reformed are called thermoplastic, and they are ideal for recycling programs.⁹

To manufacture plastic, polymer chains are stretched into long strings that are then cooled and cut into pellets. These pellets, when melted, can be extruded or molded into any shape, including bottles, film wraps, and other consumer goods. They can also be stretched into long strands and woven into fabric. In the plastics value chain, polymerization is undertaken by plastic converters, also called plastic manufacturers or processors, usually on contract for brand owners.

The most common synthetic polymers are grouped into categories, called resins. These resins are represented by Resin Identification Code (RIC) numbers on the ubiquitous recycling logo, represented by the three chasing-arrows symbol. There are seven types of plastic resins, identified by name and RIC number below.¹⁰

Polyethylene terephthalate (PET)—1. PET is a type of polyester resin. PET is non-reactive, making it ideal for food, pharmaceutical, and other health product packaging. PET is the resin of choice for most soft drink and water bottles. PET plastics can be shredded, washed, and remelted for use in new products like carpets, water bottles, clothing, fiberfill, or geotextiles. PET can also be broken down through a chemical wash and re-polymerized to make a PET resin with virgin qualities.¹¹

High-density polyethylene (HDPE)—2. HDPE is one of the most widely used plastics, and it is manufactured into plastic bottles, cups, milk jugs, bottle caps, and shampoo and soap bottles. HDPE also has broader applications,

6. Lauren Phipps, *Plastics and Polymers and Resins, Oh My!*, GREENBRZ, July 10, 2018, <https://www.greenbiz.com/article/plastics-and-polymers-and-resins-oh-my>.

7. American Chemistry Council, *The Basics: Polymer Definition and Properties*, <https://plastics.americanchemistry.com/The-Basics/> (last visited Nov. 22, 2019).

8. *Id.*

9. *Id.*

10. *See, e.g.*, AMERICAN CHEMISTRY COUNCIL, PLASTIC PACKAGING RESINS, <https://plastics.americanchemistry.com/Education-Resources/Plastics-101/Plastics-Resin-Codes-PDF.pdf>.

11. PET Resin Association, *Sustainability*, <http://petresin.org/sustainability-recyclability.asp> (last updated 2015).

including in the manufacture of folding chairs, plastic lumber, and pipes.

Polyvinyl chloride (PVC)—3. PVC is a durable, dense, weather-resistant plastic. PVC is thermoplastic and comes in both rigid and flexible varieties. One of the most common uses of PVC is for PVC pipes. Apart from construction industry applications, PVC can be made food-safe depending on chemicals added during the manufacturing process. PVC food packaging includes trays, food wraps, and plastic foils.

Low-density polyethylene (LDPE)—4. LDPE is a lighter version of its cousin, HDPE. LDPE is used in plastic shopping bags, produce bags, and most lightweight plastic film and packaging. There are also more rigid LDPE products, including bottles, containers, lids, and caps.

Polypropylene (PP)—5. PP has a higher melting point than many other plastics, making it ideal for containers destined for the microwave or the dishwasher. PP is used in microwaveable ware, kitchenware, yogurt containers, margarine tubs, and microwaveable disposable take-away containers. It is also found in disposable cups, soft drink bottle caps, and plates. More broadly, PP is used in a wide variety of durable consumer goods, including auto-body plastics, luggage, toys, and furniture.

Polystyrene—6. Polystyrene, commonly called Styrofoam, is a lightweight, heat-tolerant plastic commonly found in egg cartons, disposable cups, and take out containers. It is also used in disposable plates, trays, and cutlery.

Other—7. Number 7 resins include resins as well as other plastics such as polycarbonate and nylon. This category also includes plastics sourced from biomass and industrially compostable plastics.

These RIC numbers serve as the backbone for current recycling programs. Recycling is a four-stage process. First, post-consumer plastic goods are collected curbside by a collection company. These companies may collect single streams of recyclables, in which all recyclables are collected together, or they may collect recyclables that have already been sorted by the consumer. The recyclables then go to a sorting facility, called a material recovery facility (MRF), that organizes recyclables by resin and bundles them into large bales.

These bales are then purchased by re-processors, who shred, pelletize, or grind the polymers. This process makes it easier to melt or wash the flakes of plastic, which reduces contamination. The process of melting the plastics is called mechanical recycling, or secondary recycling. Secondary recycling is the most common recycling method, but it cannot remove colorants or other chemicals mixed with the polymer during the manufacture of the plastic. As a result, some post-consumer recycled plastics have reduced market utility or value.

After reprocessing, purified polymer flakes and bricks can be used as feedstock in the manufacture of new prod-

ucts. In order to ensure product and quality control, re-processors ordinarily have agreements with brand managers who source post-consumer recycled plastic feedstocks into their manufacturing processes.

Alternatively, plastic waste may be chemically recycled. Chemical recycling, also called tertiary recycling, subjects plastics to a chemical treatment that breaks the plastic down into its molecular components so that it can be re-polymerized.¹² Because chemical recycling reconstitutes the resin from its original molecules, all impurities and colorants can be stripped, returning the resin to near-virgin quality.¹³

II. Factors Driving Adoption of a More Circular Model of Consumption and Production

The plastics industry, and in particular the packaging industry, faces mounting pressure to reduce plastic pollution and emissions that lead to climate change. Further, international changes threaten to disrupt the current recycling business model. By incorporating more recycled plastics into new plastics manufacturing, companies can create a circular plastic economy and produce less plastic waste.

A. Consumer Pressure—Pollution

Consumers are pressuring plastic companies to address plastic waste. Plastics take thousands of years to biodegrade. Low recycling rates indicate that the bulk of plastics end up in landfills and the environment, raising concerns about physical and chemical pollution. Plastics can leach chemicals into water and soil. Marine and land animals ingest plastic. These contaminants not only disrupt the natural environment, but also work their way up the food chain to impact human health and safety, including through microplastics.¹⁴

While these problems impact the entire plastics industry, the packaging industry is under specific pressure because of the staggering volume of single-use plastic pollution worldwide. Consumers and municipalities have reacted to single-use plastic by reducing, and even ban-

12. U.S. FOOD AND DRUG ADMINISTRATION (FDA), GUIDANCE FOR INDUSTRY: USE OF RECYCLED PLASTICS IN FOOD PACKAGING (CHEMISTRY CONSIDERATIONS) (2006), <https://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/ucm120762.htm>.

13. See, e.g., Loop Industries, *Our Innovative Technology Decouples Plastic From Fossil Fuels*, <https://www.loopindustries.com/en/tech> (last visited Nov. 22, 2019); see also Press Release, CARBIOS, CARBIOS Produces First PET-Bottles From 100% Recycled Plastic Waste Using Company's Breakthrough Technology (Feb. 27, 2019), <https://carbios.fr/en/carbios-produces-first-pet-bottles-from-100-recycled-plastic-waste-using-companys-breakthrough-technology/>; see also BioCollection, *Home Page*, <https://www.biocollection.com> (last visited Nov. 22, 2019).

14. CITI GPS, *supra* note 2, at 16.

ning, consumption of certain single-use plastics, including plastic bags and straws.¹⁵

Large brand owners have already taken steps to respond to consumer pressure. In October 2018, more than 350 organizations signed the New Plastics Economy Global Commitment, a cooperative effort of the Ellen MacArthur Foundation and the United Nations Environment Programme.¹⁶ The commitment calls on large companies to “disclos[e] their annual plastic packaging volumes, marking an important step towards greater transparency.”¹⁷ Thirty-five of the organizations disclosed their plastic usage, which totaled eight million tons of annual plastic packaging.¹⁸ This group included global brand owners such as Carrefour, Colgate-Palmolive, Danone, Mars, Nestlé, SC Johnson, Coca-Cola, and Unilever.¹⁹

Consumer pressure to reduce plastic use and pollution has led companies to commit to “eliminate the plastic items we don’t need, innovate so all plastics . . . are designed to be safely reused, recycled, or composted; and circulate everything we use to keep it in the economy and out of the environment.”²⁰

B. Consumer Pressure—Climate Change

Consumer frustration with plastic consumption is part of broader consumer awareness of climate change and fossil fuel consumption. Because plastics are manufactured from fossil fuels, continued use of plastics is associated with an ongoing commitment to fossil fuel extraction. More than 90% of plastics are derived from virgin fossil fuel feedstocks.²¹ Virgin plastic accounts for about 6% of global oil consumption, and if growth proceeds as expected, it is anticipated to account for 20% of total oil consumption and 15% of the global annual carbon target by 2050.²²

Moreover, the plastics manufacturing life cycle releases greenhouse gases, and each stage of the plastic manufacturing process releases greenhouse gases. A report by the Center for International Environmental Law concludes that “if plastic production and use grow as currently planned, by 2030, these emissions could reach 1.34 gigatons per year—equivalent to the emissions released by more than

295 new 500-megawatt coal-fired power plants.”²³ Plastics also emit greenhouse gases as they biodegrade. These trace emissions are generally unaccounted for in assessments of global emissions.²⁴

C. Changes in International Law

Domestic waste challenges are compounded by changes in international trade laws restricting recycled plastic trade. First, China’s ban on recyclable plastic products has brought the plastics home for American consumers to bear. For decades, American waste companies have profited by selling plastic recyclables to China and other countries to recycle and shred recycled plastics at a lower cost than domestic American corporations. However, China tired of acting as a dumping ground for global contaminated plastics waste and the associated environmental and health impacts to its communities. Consequently China, once the world’s largest importer and processor of plastics, banned all but the cleanest plastic recyclables from its processing facilities in 2017.²⁵ Most American recycling is now being turned away, and the mounting stacks of plastic waste across the country are a poignant visual representation of America’s plastic consumption problems.

Further, the Basel Convention, which controls the movement of waste over international borders, was amended in 2019 to reclassify scrap plastics, such as those intended for recycling, as a “waste requiring special consideration” under Annex II of the Convention.²⁶ Annex II currently only includes “waste collected from households” and “residue from waste incineration.”²⁷ Until the Basel Convention amendments passed, “solid plastic waste” was listed under Annex IX, which is used to denote scrap loads that have had contaminants removed and are “prepared to a specification.”²⁸ This reclassification results in stricter regulation of recovered plastic, and shipping to other countries would become more difficult.²⁹

Consumer and legal pressure are reshaping the plastics landscape, and plastic producers, including plastic packaging manufacturers, are working to develop a solution to plastic’s externalities. There are numerous challenges to accomplishing

15. Aylin Woodward, *In Some Countries, People Face Jail Time for Using Plastic Bags. Here Are All the Places That Have Banned Plastic Bags and Straws So Far*, BUS. INSIDER, Apr. 3, 2019, <https://www.businessinsider.com/plastic-bans-around-the-world-2019-4>.

16. Jared Paben, *Brand Owners Commit to Increase Recycled Resin Usage*, PLASTICS RECYCLING UPDATE, Mar. 20, 2019, <https://resource-recycling.com/plastics/2019/03/20/brand-owners-commit-to-increase-recycled-resin-usage/>; Press Release, New Plastics Economy, Global Commitment June 2019 Report Launched (Mar. 13, 2019), <https://newplasticseconomy.org/news/spring-2019-report>.

17. Press Release, New Plastics Economy, *supra* note 16.

18. Paben, *supra* note 16.

19. *Id.*

20. NPE GLOBAL COMMITMENT, *supra* note 4, at 4.

21. *Id.* at 11.

22. *Id.* The report defines the carbon target as “the budget that must be adhered to in order to achieve the internationally accepted goal to remain below a 2°C increase in global warming.”

23. CENTER FOR INTERNATIONAL ENVIRONMENTAL LAW ET AL., PLASTIC & CLIMATE: THE HIDDEN COSTS OF A PLASTIC PLANET 1 (2019), <https://www.ciel.org/wp-content/uploads/2019/05/Plastic-and-Climate-FINAL-2019.pdf>.

24. Marcie Grabowski, *Greenhouse Gases Linked to Degrading Plastic*, U. HAW. NEWS, Aug. 1, 2018, <https://www.hawaii.edu/news/2018/08/01/greenhouse-gases-linked-to-degrading-plastic/>.

25. CITI GPS, *supra* note 2, at 23.

26. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, Annex II, Mar. 22, 1989, 1673 U.N.T.S. 57, 151 [hereinafter Basel Convention]; Rob Picheta & Sarah Dean, *Over 180 Countries—Not Including the U.S.—Agree to Restrict Global Plastic Waste Trade*, CNN, May 11, 2019, <https://www.cnn.com/2019/05/11/world/basel-convention-plastic-waste-trade-intl/index.html>.

27. Colin Staub, *Basel Amendment Proposed to Cover Scrap Plastic*, PLASTICS RECYCLING UPDATE, June 27, 2018, <https://resource-recycling.com/plastics/2018/06/27/basel-amendment-proposed-to-cover-scrap-plastic/>.

28. Basel Convention, *supra* note 26, at Annex IX.

29. See Picheta & Dean, *supra* note 26.

this goal. The next part will discuss practical impediments in the recycling supply chain to developing a circular recycling model in the United States.

III. Impediments to a Circular Economy in Plastics and Other Recycled Goods

There are several impediments to fully integrating recycled plastic into new plastic. First, citizens are not participating effectively in recycling collection programs. Second, even if collection is improved, there is a lack of domestic recycling facility capacity. As a consequence, brand managers and plastic converters are unable to reliably source recycled plastics into their products.

A. Reduced Supply of Raw Recyclable Plastic Material

The primary issue at present is that only 14% of plastics globally enter the recycling value chain.³⁰ By implication, the remaining 86% is discarded or reused. Moreover, of the plastic that enters into the recycling chain, only 2% globally is recycled into new products.³¹ The numbers for the United States are almost equivalent. In 2011, approximately 6.5% of plastics were being recycled.³²

The problem starts with recycling collection. Recycling collection is a local issue, and many communities either have limited or nonexistent recycling facilities. Additionally, consumers, the persons responsible for placing consumer waste into the recycling value chain, do not always understand how to recycle. Consumers may not understand that only certain plastic resins or materials are recyclable in their communities, recyclables must be cleaned, or that each type of recyclable material must be sorted correctly. Many unrecyclable plastic bags and films are routinely placed in plastic collection but are only recyclable when collected separately by specialized programs.

The RIC numbers contribute to the confusion of sorting recyclables because they were not designed to facilitate recyclability,³³ many products are not designed with recyclability in mind, and in many cases only certain parts are recyclable. Complex packaging design compounds the problem of consumer awareness. Plastic packaging marked with a single RIC number may also include components made from other plastics, such as films, glues, caps, and

buttons, and people may not be aware of how to recycle each of the component parts.

Ineffective consumer recycling contributes to contamination. Contamination occurs when non-recyclable trash, most often hazardous materials, food waste, and non-recyclable plastic, is placed into recycling bins. It is caused by a lack of education about what may be recycled and uneven capabilities from city to city.³⁴ Much of the recyclable material that is intended to be recycled is contaminated to a point where it must be diverted into a landfill. Determining whether a load of recycled plastic is contaminated is not an exact science, and workers ordinarily make this determination by visual inspection. This was a less widespread problem when recycling was separated by resin and type at the curb. The arrival of single-stream recycling in the early 2000s increased the ease and rate of recycling in households, but increased the complexity of processing for receivers.³⁵

When recyclable raw materials are contaminated, the cost of processing increases. Improperly recycled materials such as garden hoses and plastic bags tangle machinery, delaying processing and decreasing output. More money and time are necessary to separate the contaminants from the recyclables, and hazardous wastes create dangerous conditions for workers.³⁶ For plastic, it also means additional processes are necessary to decontaminate the plastic during mechanical recycling, and the contamination can have an impact on the appearance of the resulting feedstock.

Contamination also contributes to varying commodity prices for different plastic feedstocks, making it a challenge to define and standardize recycled plastic destined for manufacturing applications as a commodity. Otherwise stated, contamination makes it hard to standardize the commodity. When manufacturers purchase recycled plastic pellets to incorporate into their goods, expectations in terms of color and design may need to be adjusted. Unlike virgin plastic products, which can be dyed to manufacturer specifications, plastic pellets made through thermal recycling processes retain some of the colors and chemicals from the original plastics. As a result, in order to meet manufacturer specifications, MRFs pull material out of bales to match reclaimer specifications.³⁷ This decreases the amount of plastic available for recycling.

Along with the increased costs, the falling price of recyclable commodities means thin margins for recyclable

30. Citi GPS, *supra* note 2, at 12.

31. Press Release, New Plastics Economy, *supra* note 16.

32. NICKOLAS J. THEMELIS ET AL., COLUMBIA UNIVERSITY EARTH ENGINEERING CENTER, ENERGY AND ECONOMIC VALUE OF NON-RECYCLED PLASTICS (NRP) AND MUNICIPAL SOLID WASTES (MSW) THAT ARE CURRENTLY LANDFILLED IN THE FIFTY STATES 2 (2011), <https://plastics.americanchemistry.com/columbiareport/>.

33. Steve Alexander & Nina Goodrich, *In Our Opinion: How to Improve the Resin Identification Code*, PLASTICS RECYCLING UPDATE, Feb. 24, 2016, <https://resource-recycling.com/plastics/2016/02/24/opinion-improve-resin-identification-code/>.

34. David Rachelson, *14 Recycling Contamination Facts That Will Blow Your Mind*, RUBICON GLOBAL, Oct. 31, 2018, <https://www.rubiconglobal.com/blog-14-recycling-contamination-facts/>.

35. Brent Bell, *The Battle Against Recycling Contamination Is Everyone's Battle*, WASTE MGMT., Apr. 3, 2018, <http://mediaroom.wm.com/the-battle-against-recycling-contamination-is-everyones-battle/>.

36. Rachelson, *supra* note 34.

37. NATIONAL ASSOCIATION FOR PET CONTAINER RESOURCES & ASSOCIATION OF PLASTIC RECYCLERS, REPORT ON POSTCONSUMER PET CONTAINER RECYCLING ACTIVITY IN 2016, at 6 (2017), https://www.plasticsrecycling.org/images/pdf/resources/reports/NAPCOR-APR_2016RateReport_FINAL.pdf.

plastic processors and makes it hard for recycled plastics to compete with the nearest substitute, virgin plastic.

B. Lack of Capacity

Moreover, the United States at present lacks processing capacity for the recycled plastics and commodities it does have right now, which would have otherwise been upgraded in China. Waste management companies struggle to turn a profit in the new environment of low recycled plastic commodity prices and increased shipping and operating costs.³⁸ Years of export dependence have left American recycling and manufacturing facilities ill-equipped to sort, store, and process this new abundance of plastic.

For example, of the 6,172 million pounds of PET bottles available for recycling in the United States in 2016, 1,030 million pounds were converted into “clean flake” for reprocessing; this means that only 16.6% of the available plastic bottles were reincorporated into new goods.³⁹ In 2016, seven of the 28 recyclers of PET either shuttered operations or closed, removing 25% of the processing capacity.⁴⁰ Only 13 of the 21 operating plants in 2016 had authorization from the U.S. Food and Drug Administration (FDA) to produce recycled plastics suitable for food and beverage packaging use.⁴¹

Additionally, alternatives to mechanical recycling, such as chemical recycling, are currently too expensive for widespread commercial adoption. That said, any widespread adoption of commercial chemical recycling would be an industry game-changer, because it restores recycled plastic to a near-virgin condition.

An additional challenge, and one that chemical recycling may solve, is that much recycling is not circular. For example, of the 30% of PET bottles recycled in the United States, only 6% is reused in plastic bottles,⁴² a result of cascaded recycling. Cascaded recycling occurs when plastics are recycled into lower-grade, lower-value applications. By contrast, closed-loop recycling occurs when plastics are recycled into same or similar quality plastics. With cascaded recycling, value is lost during the recycling process because lower-grade plastics command a lower price in the marketplace.

C. Quality of Recycled Plastic

Demand varies with the quality of post-consumer recycled plastic feedstock. For example, high-quality recycled

PET and HDPE have the highest resale value, and there is not enough supply of these products at present to satisfy demand. But for lower-grade recycled PET and HDPE, supply currently outstrips demand.

This quality issue affects food packaging. FDA regulates the amount of recycled content that can be included in food packaging, and many recycled plastics are too low-grade to qualify. In order for a manufacturer to use recycled plastics for food-contact applications, the manufacturer must submit the following information to FDA:

- A description of the recycling process, including the source of recycled plastics and processes to reduce contamination;
- A description of how the plastic will be used;
- Test results demonstrating that the recycling process removes contaminants. The recycled plastic must not have come into contact with any contamination other than food contamination. PET and polyethylene naphthalate plastics recycled through chemical recycling are suitable for food packaging, and FDA will not evaluate these tertiary recycling methods.⁴³

Therefore, chemical or more advanced recycling processes can remedy some of these impediments with the current recycling process by stripping chemicals, dyes, and so on.⁴⁴

D. Recycling Alternatives

One additional complication to the plastics industry is consumer substitution, which decreases demand for plastics or diverts plastics out of the value chain. For example, many consumers choose to purchase goods in non-plastic packaging for the sake of avoiding plastic altogether. While this is unlikely to create sufficient disruption to the raw recycling supply, the movement toward plastic avoidance should be noted and monitored.

Additionally, many companies have recognized the problems with reusing recycled plastics in new products, and consequently have shifted to plastics-to-fuel technology as a solution to plastic waste. For example, Brightmark Energy closed a financing deal to construct a plastics-to-fuel plant in Ashley, Indiana, which began construction on May 22, 2019.⁴⁵ The technology behind the plant will

38. CITI GPS, *supra* note 2, at 24.

39. NATIONAL ASSOCIATION FOR PET CONTAINER RESOURCES & ASSOCIATION OF PLASTIC RECYCLERS, *supra* note 37, at 4.

40. *Id.* at 10.

41. *Id.*

42. CLOSED LOOP PARTNERS, CLEANING THE rPET STREAM: HOW WE SCALE POST-CONSUMER RECYCLED PET IN THE US 3 (2017), http://www.closed-looppartners.com/wp-content/uploads/2017/11/CLP-rPET-Report_Public-FINAL2.pdf.

43. FDA, *Recycled Plastics in Food Packaging*, <https://www.fda.gov/food/ingredientspackaginglabeling/packagingfcs/recycledplastics/default.htm> (last updated Mar. 21, 2018).

44. ELLEN MACARTHUR FOUNDATION, THE NEW PLASTICS ECONOMY: RETHINKING THE FUTURE OF PLASTICS & CATALYSING ACTION 21 (2017) [hereinafter RETHINKING PLASTICS], https://www.ellenmacarthurfoundation.org/assets/downloads/publications/NPEC-Hybrid_English_22-11-17_Digital.pdf.

45. Theresa Cottom, *Brightmark Energy Breaks Ground on Plastics-to-Fuel Plant*, RECYCLING TODAY (May 22, 2019), <https://www.recyclingtoday.com/article/brightmark-energy-plastics-to-fuel-groundbreaking/>.

take multiple kinds of single-use plastics and convert them into “usable products at commercial scale,” including 18 million gallons a year of ultra-low sulfur diesel. The technology is expected to evolve into chemical recycling, creating outputs that could serve as feedstocks for new plastic manufacturing.⁴⁶

While at present plastics-to-fuel production diverts plastic out of the recycling scheme, it complements a circular recycling model by diverting exhausted plastics—those that can no longer be recycled—to fuel production. While this technology prevents plastic pollution, it still contributes to global warming by creating more combustible fuel. The fuel, when burned, will release carbon dioxide and other greenhouse gases into the atmosphere.⁴⁷

IV. Solutions to Developing a Circular Plastics Economy

Plastic packaging companies are undertaking voluntary initiatives to reduce the environmental footprint of their industry, moving toward a circular economy.⁴⁸ Many of these actions also represent a significant business opportunity: recycled plastics are an undervalued commodity. According to the Ellen MacArthur Foundation, globally post-consumer single-use plastics that do not enter the recycled plastic supply chain are worth USD 80-120 billion annually.⁴⁹

Most solutions to the plastics pollution problem can be characterized as demand side or supply side, and voluntary or involuntary. As used in the rest of this Article, the supply side of recycling encompasses all the processes and companies that develop feedstocks from plastic waste, including consumer recycling activity and MRFs. The demand side includes the brand owners and manufacturers, including converters, who purchase recycled plastic feedstock for conversion into new goods. Voluntary solutions are those that are not legally binding.

A. Supply Side Voluntary Initiatives

Supply side voluntary initiatives seek to change the recycling process from the consumer end. Industry initiatives that address supply side constraints focus on facilitating recycling, for example by developing alternatives to RIC numbers. The Sustainable Packaging Coalition’s How2Recycle label informs consumers how to recycle each component of a product.⁵⁰ The label is being adopted by brand owners, including Nestlé, Chobani, Walgreens, and Huggies.

Brand owners are starting to design products to facilitate recycling. Many plastic products are not designed for recyclability. For example, the Association of Plastic Recyclers has designed a guide for package design engineers to assist in designing packaging compatible with current recycling infrastructure.⁵¹ This initiative relies on consumer behavior to carry through the recycling activity.

However, like all supply side innovations, adoption of a new recycling identification system depends on municipal waste facilities to sort and process the plastic packaging. Moreover, regardless of identification changes, many types of plastics cannot be recycled curbside. These plastics include film, bags, and wraps, which must be collected independently or dropped off at retail stores that collect these plastics.⁵² Some retailers who supply plastic bags to their customers, such as grocery stores, have provided plastic film drop-off points for consumers to ease recycling.⁵³ However, this initiative still depends on consumers to collect and transport their film to these drop points. Supply side initiatives are difficult to implement because they rely on multiple market participants, such as recycling consumers, to enact change. Consumer behavior is difficult to incentivize because there is no immediate benefit to consumers for recycling; while it is seen as the “right thing to do,” it costs them nothing to recycle ineffectively.

B. Supply Side Involuntary Initiatives

Many states have tried to curb the supply of plastics, or at least increase recycling rates. For example, some states require retailers to provide on-site recycling for plastic bags as a condition to providing plastic bags.⁵⁴ Other states incentivize plastic bottle recycling with bottle bills, which

46. There is a growing interest, supported in some states by newly passed legislation, in plastics-to-fuel technology. Gasification melts plastics in the near-absence of oxygen, which generates a synthetic gas that can fire turbines. Gasification is not cost-competitive with cheap natural gas.

A new plastics-to-fuel technology is pyrolysis, where plastics are melted at even higher temperatures with even less oxygen. Pyrolysis breaks polymers into their component monomers, which can be used for fuel or re-polymerized into virgin plastics. WORLD ECONOMIC FORUM, *THE NEW PLASTICS ECONOMY: RETHINKING THE FUTURE OF PLASTICS* (2016), http://www3.weforum.org/docs/WEF_The_New_Plastics_Economy.pdf.

47. Renewlogy is another company attempting to launch consumer-scale plastics-to-fuel technology. Renewlogy has current operations in Salt Lake City, Utah, but is intending to expand. Renewlogy, *Home Page*, <https://renewlogy.com> (last visited Nov. 22, 2019).

48. Dan Leif, *Petrochem Giants Open Up on “Plastics Waste Problem,”* PLASTICS RECYCLING UPDATE, Mar. 13, 2019, <https://resource-recycling.com/plastics/2019/03/13/petrochem-giants-open-up-on-plastics-waste-problem/>.

49. RETHINKING PLASTICS, *supra* note 44, at 11.

50. How2Recycle, *About*, <https://www.how2recycle.info/about> (last visited Nov. 22, 2019).

51. ASSOCIATION OF PLASTIC RECYCLERS, *THE APR DESIGN® GUIDE FOR PLASTICS RECYCLABILITY* (2018), https://plasticsrecycling.org/images/pdf/design-guide/Full_APR_Design_Guide.pdf.

52. How2Recycle, *Store Drop-Off*, <https://www.how2recycle.info/sdo> (last visited Nov. 22, 2019).

53. Minnie Payne, *Variety of Plastic Bags Accepted in Grocery Store Recycling Bins*, GREEN SOURCE DFW, Aug. 7, 2017, <https://www.greensourcedfw.org/articles/variety-plastic-bags-accepted-grocery-store-recycling-bins>.

54. Jennifer Schultz & Kim Tyrrell, *State Plastic and Paper Bag Legislation*, NAT’L CONF. ST. LEGISLATURES, Nov. 1, 2019, <http://www.ncsl.org/research/environment-and-natural-resources/plastic-bag-legislation.aspx>.

pay consumers to recycle their bottles.⁵⁵ Other solutions include landfills bans, which reduce plastic consumption because consumers cannot send it to the landfill, and plastic bag bans, which prevent retailers from offering plastic bags at checkout.⁵⁶ All of these laws aim to change consumer behavior.

C. Demand Side Voluntary Initiatives

Demand side reforms are preferable courses of action because they involve fewer market participants who have a vested interest in improving the recycling process. Industry action on the demand side can lead to investment in municipal recycling infrastructure and consumer awareness, two current problems contributing to low recycling rates as well as low utilization of recycling.

The global plastics industry, including brand owners and producers, is taking a leading role in stimulating the market for recycled plastics.⁵⁷ Many of these initiatives are pushed by coalitions of plastic packaging juggernauts or voluntary trade associations. Below is a snapshot of all the industry initiatives to stimulate demand for recycled plastics:

- The Global Plastics Alliance is a founding member of the Declaration of the Global Plastics Associations for Solutions on Marine Litter (the Global Declaration). The Global Declaration includes 75 plastics organizations in 40 countries that have pledged to develop and track programs to help keep plastics out of the oceans.
- The Alliance to End Plastic Waste includes industry giants Exxon, Dow, Total, Shell, Chevron Phillips, and Procter & Gamble. The Alliance members are committed to spending \$1.5 billion over five years to help solve the plastic waste problem.⁵⁸
- Leader of the Wrap Recycling Action Program (WRAP) is an initiative aimed at doubling the recycling of polyethylene wraps, bags, and film to two billion pounds by 2020.

- The American Chemistry Council's Plastics Division, which represents U.S. plastics resin producers, is committed to recycling or recovering all plastic packaging in the United States by 2040, and to further enhance plastic pellet stewardship by 2022.⁵⁹
- Brand owners are pushing higher levels of recycled content.⁶⁰ The Association of Plastic Recyclers' Recycling Demand Champions campaign is encouraging companies to voluntarily agree to incorporate more low-quality recycled plastics.
- The Sustainable Packaging Coalition has produced the *Design for Recycled Content Guide*, which provides information to brand owners and suppliers about the current opportunities in, challenges to, and myths about incorporating recycled content into all plastic resin supply chains.⁶¹

Additionally, investment funds like Closed Loop Partners are advocating greater inclusion of recycled plastics, such as a recycled PET.⁶²

Finally, GreenBlue and the Sustainable Packaging Coalition are working to establish a recycled material standard (RMS). "The RMS is being developed in accordance with ISEAL Credibility Principles and is meant to serve as a voluntary, market-based tool to be implemented by value chain participants and audited independently by credible third-party certification bodies."⁶³ First, the RMS will use a chain-of-custody tracking system based on either a percentage of recycled content or purchased credits, to ensure a certified transfer of ownership and incorporation of recycled content throughout the value chain. Similar to our proposed model below, their system would incorporate attributes of recycled content (ARCs), which are credits that can be marketed and traded. However, where we propose a model only for plastics, ARCs will be available for all recyclable materials. All products that satisfy the requirements of the program—that is, all products that have an established chain of custody through ARCs—will be RMS-certified.

55. Brian La Shier, *Bottle Bills and Curbside Collection: An Overview of Recycling Policy Approaches*, ENVTL. & ENERGY STUDY INST., Sept. 21, 2018, <https://www.eesi.org/articles/view/bottle-bills-and-curbside-collection-an-overview-of-recycling-policy-approa>.

56. Schultz & Tyrrell, *supra* note 54.

57. See MORE RECYCLING, END MARKET DEMAND FOR RECYCLED PLASTIC 16-17 (2017) (recommending demand stimulation, improved labeling and recycled plastic uptake, and "I Buy Recycled" campaign measures), http://www.plasticsmarkets.org/jsfcode/srvyfiles/wd_151/endusedemand_report_v8_1.pdf.

58. Elizabeth Royte, *Is Burning Plastic Waste a Good Idea?*, NAT'L GEOGRAPHIC, Mar. 12, 2019, <https://www.nationalgeographic.com.au/nature/is-burning-plastic-waste-a-good-idea.aspx>.

59. American Chemistry Council, *Plastic Division Member Companies*, <https://plastics.americanchemistry.com/Member-Companies/> (last visited Nov. 22, 2019).

60. Colin Staub, *Nestlé Waters Will Quadruple Recycled Plastic Usage*, PLASTICS RECYCLING UPDATE, Dec. 12, 2018, <https://resource-recycling.com/plastics/2018/12/12/nestle-waters-will-quadruple-recycled-plastic-usage/>.

61. SUSTAINABLE PACKAGING COALITION, DESIGN FOR RECYCLED CONTENT GUIDE 5 (2019) [hereinafter DESIGN FOR RECYCLED CONTENT], <https://recycledcontent.org/wp-content/themes/recycled-content-guide/SPC-RecycledContentGuide.pdf>.

62. CLOSED LOOP PARTNERS, *supra* note 42, at 3.

63. GREENBLUE, DRAFT DISCUSSION DOCUMENT, RECYCLED MATERIAL STANDARD 1 (2019) (on file with authors).

D. Demand Side Involuntary Initiatives

Demand side involuntary initiatives include all laws that impact the brand owners and manufacturers of plastics. Broadly, these laws fall into a category of laws called extended producer responsibility (EPR). Also known as product stewardship, EPR laws and policies shift responsibility for post-consumer goods back to the manufacturer. In this way, the costs of disposal are factored into the cost of manufacturing the product, supporting a circular life cycle for the product. EPR implements a circularity in the waste management, thereby minimizing waste and promoting responsible manufacturing. For example, CalRecycle, California's state agency responsible for recycling, has developed a checklist to ensure new product stewardship legislation passed by the California Legislature satisfies the principles of EPR.⁶⁴

Minimum recycled content laws are a form of EPR that can accelerate market adoption as well as the associated environmental benefits. They also avoid the free-rider problem of most voluntary initiatives, mitigating the financial and technological risk facing first movers. A statutory requirement for a minimum quantity of recycled material in qualifying plastic goods would also have incidental benefits on the recycled plastics supply chain. It would improve the recycled plastics stock through consumer awareness and through technological developments that facilitate recycling.

Many states have already imposed a statutory recycled content requirement but have not realized the benefits. Over the past 30 years, states have experimented with minimum recycled content laws, which in the 1990s were called rigid plastic container laws. States adopted minimum recycled content laws to increase stateside recycling rates and divert plastics and other recyclables away from landfills. These laws required that plastic containers or other products, as defined by regulation, contain a minimum percentage of recycled material. Recycled material levels were defined and certified by external organizations. California, Oregon, and Wisconsin adopted minimum recycled content laws.⁶⁵ While a full review of these laws is beyond the scope of this Article, a few observations are warranted.

First, the purpose of these laws generally was to increase the recycling participation. To that end, both California and Oregon originally adopted two ways for producers to comply. First, all covered entities were deemed compliant if the state recycling levels met a certain threshold. If the

state recycling levels did not meet the threshold, then covered entities had to demonstrate a certain minimum content percentage. The legislation applied to certain plastics, such as rigid plastics like yogurt containers. Recycled content was defined to include post-consumer plastics. Food-grade plastics were exempt from the minimum content requirements.

Rigid plastic container laws remain on the statute books in a couple of states, but there are few indications of positive results or moves for reform, adoption, or enforcement. One of the obvious reasons is that California, Oregon, and Wisconsin found other ways to incentivize recycling, rendering rigid container legislation superfluous. Second, as described in this Article, there is a correlation, but no causation, between increased consumer participation rates and uptake of recycled plastics in product design.

In 2018, Sen. Bob Wieckowski (D-Cal.) proposed a bill directing CalRecycle to establish minimum levels of recycled content for use in the manufacture of all beverage containers by 2021. The bill was approved by the Assembly Natural Resources Committee.⁶⁶ The bill would apply only to PET bottles, which would be required to contain at least 20% post-consumer recycled plastic.⁶⁷ There has been no movement on the bill since late 2018.

Finally, many trade organizations and industry participants are already advocating for legislation to provide legislative certainty and mitigate economic risk.⁶⁸

V. A Solution

We propose legislation introducing a minimum recycled content percentage in new plastic products. Under this model legislation, covered entities must submit to an administrator renewable plastic credits equal to their compliance obligation. Although our proposal will only focus on one form of plastic product, plastic packaging, it is designed for broader recycling challenges because we recognize that the recycling industry broadly is integrated, and any meaningful demand solutions must be designed with that industry in mind.

Previous demand side involuntary solutions did not incorporate market solutions, such as a recycled content credit that can be traded from companies that use more recycled plastic to those that cannot incorporate the minimum recycled content. Incorporating a market-trading system will spur investment in recycling technology development and new ways to reuse plastics, increasing domestic recycling capability and thereby creating a thicker market

64. CalRecycle, *Resources*, <https://www.calrecycle.ca.gov/EPR/Resources/> (last updated July 23, 2019).

65. WIS. STAT. ANN. §100.297 (West 2019). Wisconsin required 10% recycled content by weight for rigid plastic bottles, cans, jars, and cartons that were intended for retail sale. *Id.* In 1991, Oregon passed the Recycling Act, which required a 25% statewide recycling rate and a 25% minimum recycled content in all rigid plastic containers. *See* OR. REV. STAT. §§459A.650-.665 (1991). The California Rigid Plastic Packaging Container Act was passed in 1991. *See* CAL. PUB. RES. CODE §42300 (West 1991); *see also* CAL. CODE REGS. tit. 14, §17943 (1991).

66. Press Release, California Senator Bob Wieckowski, *Wieckowski Bill to Expand Recycled Content Requirements to All California Beverage Containers Passes Assembly Committee* (June 25, 2018), <https://sd10.senate.ca.gov/news/2018-06-25-wieckowski-bill-expand-recycled-content-requirements-all-california-beverage>.

67. *Id.*

68. Clarissa Morawski, *In My Opinion: It's Time for Recycled-Content Mandates*, RESOURCE RECYCLING, Nov. 28, 2017, <https://resource-recycling.com/recycling/2017/11/28/opinion-time-recycled-content-mandates/>.

in recycled plastic. Moreover, the historically volatile recycling market would stabilize with guaranteed demand for credits and allow for investment in recycling. These innovations would in turn stabilize the price of recycled plastic feedstocks, leading to higher participation and competition in domestic processing.

The model law and the market it creates is based largely on the renewable fuel standards created by the Energy Policy Act of 2005 and the Energy Independence and Security Act of 2007. The Energy Policy Act states that when biofuel is produced, each gallon is assigned a renewable identification number (RIN). Obligated parties purchase biofuel in quantities to satisfy their required volumes and surrender the attached RINs to covered entities. Should a purchaser exceed their required volume of biofuel, the RINs may be separated from the biofuel and sold to other obligated parties to satisfy their obligations. To determine the annual volume requirement, obligated parties submit their estimates of yearly fuel usage to the U.S. Environmental Protection Agency (EPA). The Administrator then issues a total volume requirement, to be divided between obligated parties.

To create a market and stimulate recycled plastic usage, the model law would function similarly. The Administrator would determine the compliance obligation by obtaining estimated plastic usage from brand owners (the covered entities). The Administrator, taking into account the amount to be produced, the state of the raw supply, and domestic processing capacity, would issue a minimum percentage. This would be converted to a weight quantity for each covered entity. The covered entity would be required to surrender compliance instruments equaling their required tons of recycled content. These instruments would be called recyclable plastic credits (RPCs).

RPCs are generated at the recycled feedstock level. Each covered entity must purchase a required quantity of recycled feedstock and the associated RPCs. Should the covered entity have the ability to incorporate more recycled plastic than the regulatory annual requirement, the brand owner may sell these RPCs to other obligated parties for their own compliance requirements.

A. Defining the Commodity—Recycled Content

The legislative scheme must define “recycled content.” Standardization of the RPC commodity is critical because “recycled content” is the core of the compliance obligation and the credit system, and essential to both environmental and market integrity.

With respect to environmental integrity, because the environmental goal is to reduce the amount of consumer plastic in landfills, a definition should limit the commodity to post-consumer recycled plastics.⁶⁹ Pre-consumer, or

post-industrial, materials are already widely incorporated and therefore do not contribute toward the environmental objectives.

Second, any satisfactory definition should exclude reuse of plastic packaging, which is consistent with EPA and FDA guidelines. According to FDA:

[R]euse is regarded simply as one form of source reduction, i.e., minimizing the amount of material entering the environment. In simple reuse, the package remains intact and is reused in its original form. In secondary and tertiary recycling, the original package is destroyed, and new packaging is formed from the remains.⁷⁰

Reuse, although it promotes environmental goals and drives packaging design reform, does not promote circularity within the plastic manufacturing process, and therefore would not qualify under the definition.

To define post-consumer recycled content, the legislative scheme can refer to and incorporate existing international standards, such as International Organization for Standardization (ISO) 14021:2001, Environmental Labels and Declarations, and it should also refer to existing laws. For example, some states already have definitions of recycled content, and federal law already defines recycled content. FDA has a definition of recycled content for the purpose of food packaging, which provides that all resin produced through chemical recycling satisfies the FDA requirements for plastic food packaging. However, mechanical recycling processes do not necessarily satisfy this definition.

The takeaway from FDA and state laws is that the definition for recycled content for any law adopted must (1) consider the quality of the recycling process and resulting product and (2) conform with existing laws, with which manufacturers and brand owners are already complying. Ensuring that the definition contemplates these uses will help to standardize the recycled-plastic commodity and facilitate uptake in the value chain. Because the definition of “recycled content” is part and parcel of the traded commodity, we also address some of these issues in the discussion on issuance and verification of recycled content credits.

B. RPCs—Issuance and Verification

Verification of recycled content, and therefore the issuance of RPCs, poses administrative hurdles. First, the processor must have the recycling process certified and the feedstock verified to ensure environmental and market integrity. Although the Administrator could perform these func-

called primary recycling, is the use of pre-consumer industrial scrap and salvage to create new packaging. This is already common industry practice.

70. FDA, *supra* note 12; see also FTC Guides for the Use of Environmental Marketing Claims, 16 C.F.R. pt. 260 (2012), available at <https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=1&SID=39fcec6c3feb4f12eac6f0a046aa4488&ty=HTML&h=L&mc=true&tr=PART&n=pt16.1.260>.

69. For recycled PET, there are two types of recycled content: post-industrial recycled content and post-consumer. Post-industrial recycled content, also

tions, a more efficient method may be to delegate these functions to a VCSB, which are already in use by the recycling industry.⁷¹ VCSBs are

organizations which plan, develop, establish, or coordinate voluntary consensus standards using agreed-upon procedures . . . A voluntary consensus standards body is defined by the following attributes: (i) openness, (ii) balance of interest, (iii) due process, (iv) an appeals process, (v) consensus, which is defined as general agreement, but not necessarily unanimity, and includes a process for attempting to resolve objections by interested parties, as long as all comments have been fairly considered, each objector is advised of the disposition of his or her objection(s) and the reasons why, and the consensus members are given an opportunity to change their votes after reviewing the comments.⁷²

Standards developed by VCSBs may reduce administrative costs. Section 12(d) of the National Technology Transfer and Advancement Act calls for federal agencies to utilize the “technical standards that are developed or adopted by voluntary consensus standards bodies, using such technical standards as a means to carry out policy objectives or activities determined by the agencies and departments.”⁷³ In requiring that agencies adopt voluntary consensus standards where compatible with law, the statute drastically reduces the amount of research, rulemaking, and adjudication that a standard promulgated through Administrative Procedure Act procedures would demand. This process essentially outsources the process to experts in particular industries. Regulated parties have a say in how they and their competition are measured for compliance purposes. The use of VCSBs to regulate plastic recycled content is likely to result in better recycling standards.

Examples of VCSBs include ISO standards and Cradle to Cradle.⁷⁴ Another option would be for the Administra-

tor to delegate the task to an industry association, such as the Association of Plastic Recyclers or Sustainable Packaging Coalition, to develop the standard.

Once the standard is set, the Administrator can delegate the process of auditing and certifying RPCs to certified private organizations with experience in sustainability management and compliance—for example, certifying compliance with the Guides for the Use of Environmental Marketing Claims, also known as the Green Guides. SGS and GreenCircle Certified are two examples of a potential private party that could be contracted by the processor for this purpose.⁷⁵

Additionally, the Federal Trade Commission publishes the Green Guides, which could provide some guidance for labeling and standards.⁷⁶ The Green Guides specify the conditions under which eco-labeling may be used to avoid confusion and deceptive practices. Covered entities should follow the eco-labeling standards, which will allow them to capitalize on goodwill by marketing compliance.

C. Compliance Obligation

The “compliance obligation” is a minimum percentage of recycled content.⁷⁷ We propose an initial minimum percentage of 35%, based on estimates from the Ellen MacArthur Foundation that the current market can reasonably bear a 25% minimum recycled content requirement absent any legislative initiative.⁷⁸

The required plastic percentage would need to be high enough to incentivize investment in domestic recycling capacity, whether chemical or thermal/physical. If the required percentage is set too low, then the demand for raw recycled plastic would be too easily met by current production capacity. In order to stimulate the market, the percentage would need to force competitors in plastic packaging manufacturing to choose between investing in recycled plastic production or buying renewable plastic credits. If the requirement is too low, no market in renewable plastic credits will develop, and consequently no efficiency gains would result from their adoption. Moreover, the percentage should increase over time to ensure that recycling remains incentivized. As production capacity and technology become cheaper, the credit program must always incentivize recycling participation over efficient breach and disposal of excess plastic.

71. See, e.g., SCS GLOBAL SERVICES, RECYCLING PROGRAM STANDARD: ENVIRONMENTAL CERTIFICATION SERVICES (2014), https://www.scsglobalservices.com/files/standards/scs_stn_recyclingprogram_v4-0_040214.pdf.

72. Memorandum from the Office of Management and Budget to the Heads of Executive Departments and Agencies, Revised OMB Circular No. A-119 (Feb. 10, 1998), <https://www.whitehouse.gov/wp-content/uploads/2017/11/Circular-119-1.pdf>.

73. National Technology Transfer and Advancement Act, 15 U.S.C. §§3701 et seq.; see also U.S. EPA, *Summary of the National Technology Transfer and Advancement Act*, <https://www.epa.gov/laws-regulations/summary-national-technology-transfer-and-advancement-act> (last updated May 6, 2019).

74. Cradle to Cradle is a consumer certification organization. According to their website:

The Cradle to Cradle Certified™ Product Standard guides designers and manufacturers through a continual improvement process that looks at a product through five quality categories—material health, material reutilization, renewable energy and carbon management, water stewardship, and social fairness. A product receives an achievement level in each category—Basic, Bronze, Silver, Gold, or Platinum—with the lowest achievement level representing the product’s overall mark.

Cradle to Cradle Products Innovation Institute, *What Is Cradle to Cradle Certified™?*, <https://www.c2ccertified.org/get-certified/product-certification> (last visited Nov. 22, 2019).

75. SGS, *Sustainability*, <https://www.ssgroup.us.com/en/sustainability> (last visited Nov. 22, 2019); GreenCircle Certified, *Home Page*, <http://www.greencirclecertified.com> (last visited Nov. 22, 2019). The European Union (EU) is also working toward developing an EU-wide certification process for recyclers to develop traceability and consistency in recycled content in plastics. European Commission, *European Certification of Plastics Recyclers (EUCERTPLAST)*, <https://ec.europa.eu/environment/eco-innovation/projects/en/projects/eucertplast> (last updated Nov. 24, 2019).

76. FTC Guides for the Use of Environmental Marketing Claims, *supra* note 70.

77. See *supra* Section V.A., for a definition of “recycled content.”

78. Press Release, New Plastics Economy, *supra* note 16.

Because plastic packaging manufacturers produce different quantities of product, the compliance obligation, expressed as a percentage, would be converted into a weight for the purposes of determining the total amount of the compliance obligation. For example, a hypothetical large company may produce 10,000 kilotons per annum (KTA) of PET packaging material each year. A legal requirement of 25% recycled content would translate to a required 2,500 KTA of recycled content.

D. Covered Entities

The “covered entities” are the brand owners: Nestlé, Coca-Cola, Procter & Gamble, and so on. This is to ensure that the market includes a sufficiently large segment of the packaging industry. Placing the administrative and legal burden on the brand owners insulates the manufacturing companies from liability. Moreover, brand owners are consumer-facing and benefit from consumer goodwill; this benefit justifies the allocation of risk. Brand owners choose manufacturers to source their plastic packaging, and thus exercise sufficient control over the process to justify regulating them. Complications in enforcement may arise where there is insufficient supply or a dearth of compliant manufacturers. This may justify some sort of waiver provision in the model law to allow for an exemption where compliance is practically impossible.

The “administrator” is the government agency in charge of administering the program. These functions will include determining the method of calculating each covered entity’s legal compliance obligation (described above), issuing credits and certifying recycled content (discussed below), and tracking credits through the value chain, which could be done through an online portal. The administrator must also establish a market for credits, as well as receive and retire compliance credits. The most important step is certifying and monitoring the chain of custody of the recycled plastic feedstock to ensure it is actually incorporated into end products, thereby ensuring the integrity of the market. In practice, some of these functions, particularly certifying post-consumer recycled content, may be delegated to industry standards organizations that are already active in verifying recycled content.

E. Compliance Period

The model law must also contain a compliance period, at the end of which the covered entities must surrender their RPCs to the Administrator. We suggest an annual true-up period (covered entities report annually), but that a deficit may be carried forward over several years, to be trueed up at the end of a three-year period.⁷⁹ Setting up this process would incentivize innovation in recycling processes and

manufacturing for brand owners that are establishing a content requirement but will require several years to see the results. We also suggest that no credits may be carried forward after the true-up period, to ensure that credits trade in the marketplace. This setup, however, should be further researched.

F. RPCs and Market Function

RPCs are the instruments that covered entities surrender to satisfy their compliance obligation. At the end of the compliance period, covered entities will submit to the Administrator a number of credits equal to 35% of the total plastic volume of their containers. A credit system allows for the environmental attributes to be conceptually severed from the physical product. The credit can be bundled with the recycled plastic content, or it can be bought and sold independently, allowing for companies with products that can incorporate more recycled plastics into their packaging trade credits to those companies that cannot. Just as the severance of RINs occurs at the time of biofuel blending, the RPC code is “separated” from the recycled plastic once the recycled plastic is blended into a new product and submitted for compliance purposes or sold.

In practice, this leads to cooperative development of recycling capacity. Covered entities contract with their plastic packaging manufacturers, such as Dow Chemical, to ensure that they source their recycled plastics from a compliant recycled plastics processor, who generates the feedstock. The recycled plastics producer is responsible for getting RPCs from the Administrator to certify each unit of the recycled plastic. This feedstock is then incorporated into the manufacturing process, and the RPCs transfer along with the recycled material to the manufacturer followed by the covered entity, who submits the RPCs along with a certification of the total volume of plastic produced.

However, because RPCs can be traded, covered entities may also comply by buying RPCs on the market. So long as the covered entity surrenders a number of RPCs equal to its compliance obligation, then the origin of the RPC is irrelevant. In practice, RPC numbers will vary with the type of plastic resin, and therefore could correspond to RIC numbers.⁸⁰ A covered entity could submit RPCs of any vintage or type to satisfy the compliance obligation.

For example, a manufacturer of clamshells or deodorant containers may be able to incorporate a higher percentage of recycled plastics than a manufacturer of yogurt containers. In this case, the manufacturer of yogurt containers could purchase additional

79. See *infra* Section V.H., for discussion of RPC banking.

80. Identifying RPCs by their RIC would allow the Administrator to monitor what classes of plastics are being recycled. This could theoretically create multiple commodities, as each RPC would correspond with a quantity of a different type of recycled plastic. For the proposed system, a ton of recycled plastic of any kind would satisfy the legal obligation; this results in a single commodity in practice. Should the Administrator choose to promote recycling of a certain type of plastic later, the Administrator could divide the compliance obligation by RIC type, creating multiple markets.

RPCs from the clamshell manufacturer, even if the packaging uses different plastic resins.

This trading system also incentivizes the yogurt container brand owner to modify their packaging design to better incorporate recycled plastic, and to work with manufacturers to develop more reliable supplies of recycled plastic feedstock. It could also incentivize brand managers and plastic manufacturers to move away from harder-to-recycle plastics.

Requiring brand owners that use plastic packaging to comply with the statute addresses several issues. First, this market setup captures companies that use a significant amount of PET, which means that this would essentially be a market of PET. However, including all processors who supply recycled plastics up to the brand owners ensures that brand owners cannot escape the market by switching to a different form of plastic. This problem would occur if only PET plastics were included in the market, in which case the increased cost of PET plastics would incentivize brand owners to switch to a lower-cost alternative polymer where their product allows. In this case, the recycled content requirement would become a voluntary standard, replete with all the issues discussed above, and fail to deliver the environmental benefits. In short, manufacturers of plastic packaging would continue to face the same amount of economic risk.

As a practical matter, PET will likely form the bulk of credited recycled plastic. PET is easily recycled. Chemically recycled PET is safe for food and health product packaging, and it is possible to use 100% recycled PET in new products, subject only to aesthetic concerns. As a consequence, there is already high demand for recycled PET.⁸¹ However, once the stock of recycled PET, both high- and low-quality, is exhausted, brand owners will have to work with manufacturers and processors on new technology and product designs for other plastic resins, thereby creating efficiency and environmental gains.

G. Price-Setting and Information

A properly set minimum requirement would ensure that the RPC commodity would be priced appropriately. Trading could occur either through a public exchange or through private, over-the-counter transactions. A public exchange system would supply greater information to buyers and sellers, but conversely, it could potentially increase administration costs. Over-the-counter private transactions would decrease transparency in such a market, but this effect may be somewhat mitigated by the limited number of repeat market players. Buyers and sellers of credits

will be sophisticated and highly involved in the market, meaning information will be more transparent than that in a market consisting of novice one-off participants.

H. Price Volatility

Such a credit system would require careful design to avoid the pitfalls of the biofuel RIN market. Because the RIN market has been opaque, hedgers and speculators have hoarded credits to sell when prices rise.⁸² EPA is considering market limitations such as position limits, which would restrict companies' ability to hold onto credits for later sale, and participation restrictions, which would limit participation in the market to parties obligated to participate.⁸³ By removing non-obligated parties, EPA would somewhat restrict parties' ability to reallocate risk to hedgers and speculators while also preventing some of the gamesmanship that has contributed to RIN market volatility.

This could be mitigated in the RPC market by facilitating increased transparency and possibly restricting parties' ability to roll over credits. Transparency is addressed above. Rollover or banking restrictions decrease the flexibility of the market but increase administrability. By requiring that RPCs be used within 12 months of generation, the volatile effects of hedging and speculating could be somewhat chilled. However, it may create a cap on the amount of recycled plastic manufacturers and covered entities purchase; once their obligations are satisfied, the covered entities either stop integrating recycled plastics or sell credits to other covered entities within a set time frame. With upcoming technological changes, limiting the ability to bank credits may undermine the purpose of the market.

I. Exceptions and Exemptions

The model law should also contain exemptions. First, the model law contains a general waiver similar to that used for the renewable fuel standard. If the Administrator finds that there is an inadequate domestic supply or that the requirement would severely harm the economy, the Administrator has the discretion to waive the requirement.

The model law should also include case-by-case waivers. Companies that use biodegradable packaging should be able to opt out of the compliance obligation for those products, as biodegradable packaging achieves many of the same benefits as circular recycling. The model law would also exempt the reuse of packaging, which would cover new packaging companies that ship containers to consumers and pick them up for reuse, like the milk-container delivery model of the 1950s. Smaller producers and com-

81. See, e.g., Colin Staub, *Demand Growth Key to Plastics Recycling Acquisitions*, RESOURCE RECYCLING, Jan. 22, 2019, <https://resource-recycling.com/recycling/2019/01/22/demand-growth-key-to-plastics-recycling-acquisitions/>. By contrast, polystyrene is more challenging to recycle compared with other plastic resins. Recycling polystyrene requires compactors and logistical systems, resulting in inconsistent supply. As a result, manufacturers are unable to obtain sufficient scrap for new products.

82. Jennifer A. Dlouhy & Mario Parker, *EPA Is Said to Weigh Ban on Banks' Role in Biofuel-Credit Review*, BLOOMBERG, Feb. 21, 2019, <https://www.bloomberg.com/news/articles/2019-02-20/trump-agency-said-to-propose-overhaul-of-biofuel-credit-trading>.

83. *Id.*

panies with non-packing plastic products should be able to opt in to incentivize use of recycled plastics in other products, like large Tupperware containers, totes, carpets, and so on. Allowing other companies to opt in will also generate market information about how recycled plastics can be used more broadly. Finally, companies should be able to opt out, or apply for an exemption with evidence of undue financial hardship or insufficient market supply. These are all details that will require additional research.

Further development is required to determine whether companies that finance activities that support the development of recycling processing, for example plastic-to-fuel, should be able to qualify for an exemption. On one hand, allowing these companies to qualify for an exemption would incentivize investment in the technology that drives chemical recycling, which would benefit the circular polymer market. However, diverting recyclable plastic supply out of the market for end-use as fuel would have a market-distorting effect, unless properly regulated to allow only those plastic items that can no longer be recycled. More research is required to determine if and how a model minimum recycled content law can support plastic-to-fuel companies.

J. Level of Government Best Suited to Adopting the Model Law

1. Federal Legislation

Congressional members could enact new legislation, which could empower EPA to oversee the program. The U.S. Congress has authority to legislate this issue under the Commerce Clause, as it regulates recycled plastics that move in interstate commerce.⁸⁴ Although congressional legislation regulating recycled plastic would be clearly within its enumerated powers, passing such a law will require political will. It is unclear whether the current Administration would support the model law. Political support is conceivable. Though he has espoused a desire to reduce environmental regulations drastically, President Donald Trump signed the bipartisan Sullivan Bill, called “Save Our Seas,” reauthorizing the Marine Debris Act. Further, the recycled plastic minimum would be a way to create American jobs and reduce international trade in plastic waste, which would support the president’s isolationist goals.

84. *Cf. Nat’l Fed’n of Indep. Bus. v. Sebelius*, 567 U.S. 519 (2012); Corey Walker, *Using the Supreme Court’s Enigmatic Commerce Clause Holding in Sebelius to Challenge Congress’s Broken Renewable Fuel Standard*, 68 AM. U. L. REV. 667 (2018), available at <http://www.aulawreview.org/using-the-supreme-courts-enigmatic-commerce-clause-holding-in-sebelius-to-challenge-congress-broken-renewable-fuel-standard/>. It remains somewhat unclear if Congress can create a market under the Commerce Clause, or if this is creating the predicate to the exercise of its authority under the Necessary and Proper Clause.

2. Federal Executive Agency Regulation

Alternatively, the model law may be promulgated as a regulation under an existing legislative scheme through notice-and-comment rulemaking. There are two potential avenues. First, the trading program could possibly be enacted by the National Oceanic and Atmospheric Administration under the Marine Debris Act, which provides that the administrator should support the development of systems and materials that reduce “the amount of solid waste that is generated from land-based sources and the amount of such waste that enters the marine environment.”⁸⁵ The model law would reduce the amount of plastic available to become pollution, but the connection to marine debris specifically may be too tenuous to survive litigation.

Alternatively, the model law could be promulgated as a regulation under the Clean Air Act (CAA)⁸⁶ as a process targeted at reducing greenhouse gas emissions. Greenhouse gases threaten human health and the environment, and therefore may be regulated; this finding is supported by the U.S. Supreme Court and an endangerment finding by EPA.⁸⁷ Using recycled plastics produces fewer greenhouse gas emissions compared with refining virgin plastics, and they also reduce our reliance on fossil fuels for new plastics; by way of example, replacing virgin PET with recycled PET reduces greenhouse gas emissions by half.⁸⁸ Moreover, all plastic manufacturers are already regulated under the CAA as emitters of criteria and hazardous pollutants.⁸⁹ EPA may regulate these sources as “anyway” sources.⁹⁰

3. State-Level Legislation

States can pass the law under their police powers, and states that already have a rigid container law or similar legislation could pass amendments codifying a market. This is one way that California could pass the law.⁹¹ One state, such as California, could drive the entire market by obligating any brand owner that sells products in plastic packaging, or manufactures plastic packaging, in California destined for the California market. There may be issues with the dormant Commerce Clause if the rule is tailored to those producing plastic in California; however, by tailoring the recycled content requirement to all goods sold within California, the law may overcome any discriminatory effects that violate the dormant Commerce Clause.

85. Marine Debris Act, 33 U.S.C. §1952(1)(B).

86. 42 U.S.C. §§7401-7671q, ELR STAT. CAA §§101-618.

87. *Massachusetts v. Env’t. Prot. Agency*, 549 U.S. 497, 37 ELR 20075 (2007).

88. DESIGN FOR RECYCLED CONTENT, *supra* note 61, at 16.

89. *See* 40 C.F.R. subpt. DDD (2015).

90. *Utility Air Regulatory Group v. Env’t. Prot. Agency*, 573 U.S. 302, 44 ELR 20132 (2014).

91. S.B. 168, 2017-2018 Leg., Reg. Sess. (Cal. 2018), https://leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=2017201805B168.

However, multiple states could also come together to create a national market. If multiple states pass an equivalent law, then trading can occur so long as the credits issued in one state are recognized for compliance purposes in another state. This model is analogous to California's carbon trading market, which is linked with Québec.

Passing at the state level could result in administrative overlap and federalism problems. Regardless, passing the law at either level would allow the United States to demonstrate leadership at a time when other countries are passing similar legislation, which will eventually impact companies that have international operations. The United Kingdom is introducing a tax on plastic packaging that contains less than 30% recycled content. The tax will take effect in 2022.⁹²

VI. Conclusion

Solving the plastic pollution problem requires innovation in recycling processes, and involuntary demand side regulation with market functions would lead to innovation in domestic capacity in the most efficient way possible. We propose legislation establishing a mandatory market in recycled plastic for plastic packaging to mitigate the financial risk of incorporating recycled plastics in feedstocks.

Under our proposal, all brand owners must incorporate a minimum percentage of recycled plastic into their packaging, evidenced by submitting a proportionate amount of renewable plastic credits certified by a designated certification agency to a designated government agency. These credits could be traded for compliance purposes. This legislative model could be adopted either by Congress or by state governments, and the model could be scaled to facilitate incorporating recycled content into other plastic products.

92. NPE GLOBAL COMMITMENT, *supra* note 4, at 197.