

# The Complex Challenges Facing Sustainable Food Packaging

By **Peter Coneski and Natalie Rainer** (October 8, 2024)

Although an appreciation for the technological design of materials that keep foods safe to consume is far from universal, food packaging is no longer an afterthought for many consumers.

In fact, recent surveys indicate that the sustainability and composition of packaging materials are becoming increasingly important factors in product selection for many consumers.[1]

In response to the consumer outcry for safe and sustainable packaging, lawmakers in numerous jurisdictions have put forth bills seeking to curb the use of certain types of single use plastics, mandate the use of recycled content in packaging materials, and require certain information about the anticipated life cycle of packaging options be made available to consumers.

The most striking legal development to further these efforts has been the emergence of state laws on extended producer responsibility, or EPR, for packaging. In May, Minnesota joined California, Colorado, Maine, Oregon and Washington in passing EPR legislation.

Similar bills have been introduced in an additional eight states in 2024 alone. The California law notably requires that packaging and related food service items must be 100% recyclable or compostable by 2032.

Such laws seek to lessen the environmental burden of packaging materials. But they are creating complex technological and regulatory challenges for packaging material producers, who must simultaneously comply with these state laws and with U.S. Food and Drug Administration requirements applicable to food packaging.

In this article, we discuss legislation intended to reduce the environmental impact of food packaging, FDA regulatory issues related to packaging, and the pressures that these policies place on packaging companies.

## State EPR Statutes

EPR is a concept that is intended to decrease the environmental impact of a product by assigning responsibility of the entire life cycle of that product to the manufacturer. In general, this strategy entails adding the product's estimated environmental costs to its market price, in an attempt to increase product recovery at the end of its life cycle, and ultimately minimize the product's environmental impact.

Although EPR statutes in the U.S. have existed for some time in many localities for products such as batteries, tires and electronics, EPR schemes for packaging materials are still relatively new. Maine was the first state to pass packaging EPR legislation in 2021 (L.D. 1541).[2]

Since then, California (S.B. 54),[3] Colorado (H.B. 22-1355),[4] Oregon (S.B. 582),[5] Washington (H.B. 1131)[6] and, most recently, Minnesota (H.F. 3577)[7] have passed



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similar EPR schemes.

The trend appears to be continuing. Hawaii (S.B. 2368),<sup>[8]</sup> Illinois (S.B. 3795),<sup>[9]</sup> Massachusetts (H.B. 4263),<sup>[10]</sup> New Hampshire (H.B. 1630),<sup>[11]</sup> New Jersey (S.B. 208),<sup>[12]</sup> New York (S.B. 4246),<sup>[13]</sup> Rhode Island (H.B. 7023)<sup>[14]</sup> and Tennessee (S.B. 573)<sup>[15]</sup> all have pending legislation to implement EPR requirements.

These laws tend to place the compliance obligation on the brand owner — e.g., the maker of the consumer product in the packaging — not on the packaging producers, to meet the goals of the EPR program. Across states, these goals include, but are not limited to:

- Reducing the volume of packaging material entering the waste stream;
- Reducing the toxicity of packaging material — e.g., by banning per- and polyfluoroalkyl substances, or PFAS, in fiber-based packaging;
- Increasing the recyclability and recycling rates of packaging material; and
- Encouraging compostable packaging.

Brand owners are required to join producer responsibility organizations that oversee waste management strategies for affected products. Dues paid by producers, typically based on market share and recyclability of covered products, fund the operation of PROs, and invest in recycling infrastructure and consumer education on how to reduce waste.

California's law, S.B. 54, goes one step further, seeking to make packaging and food service items 100% recyclable or compostable by 2032. The state is still in the process of determining what is considered recyclable in the state based on another statute, S.B. 343.<sup>[16]</sup>

S.B. 343 requires that only materials that are actually recycled in California at a rate of at least 60% can be considered recyclable, and only these materials will be eligible to bear a "chasing arrows" recyclability mark.

Under the plain language of the statute, regulators do not have the authority to grant exceptions to the 60% standard. Therefore, if a given material has a recycling rate of 58%, it will not be considered recyclable, and cannot bear a chasing arrows symbol.

It would also not be recyclable under S.B. 54. Walking through the grocery store aisles, it is apparent how few products are currently recyclable or compostable. For example, most squeeze pouches, stand-up pouches, shrink wrap, bags, films and similar packaging are neither recyclable nor compostable.

Thus, the market has a long way to go from current practices to achieving the zero-waste packaging goal.

These EPR laws are among a number of state policies targeting packaging.<sup>[17]</sup> These mandates place pressure on packaging manufacturers to develop materials that meet environmental goals, while also complying with strict regulatory requirements at the federal level under the Food, Drug and Cosmetic Act, or FDCA. We discuss these pressures below.

## **EPR Legislation, Packaging Innovation and FDA Regulatory Burdens**

State EPR laws are pushing industry to mitigate the environmental burden of packaging materials through the use of:

- Lighter-weight packaging, also known as source-reduced packaging;
- Recyclable packaging;
- Packaging with increased recycled content; and
- Compostable packaging.

With respect to food packaging, these pressures come up against competing FDA regulatory requirements to ensure food safety under the FDCA. Under Title 21 of the U.S. Code, Section 321(s), packaging materials are considered potential food additives, and require premarket clearance under certain circumstances.[18]

### ***Lightweighting***

Lightweighting packaging is not simply a matter of using less material. Food packaging in particular must protect the product contained therein.

Thinner construction has the potential to jeopardize the mechanical integrity of the packaging. In addition, it can facilitate molecular transport through the packaging, which can reduce its gas barrier properties, and result in more rapid food spoilage and a shorter product shelf life.

Thus, efforts to further lightweight packaging will require efforts to develop new technologies to maintain the performance levels of current packaging materials.

For example, prior lightweighting initiatives for plastic beverage bottles were accompanied by the development of materials-based solutions to maintain food preservation capabilities. These included oxygen-scavenging systems, such as unsaturated hydrocarbon polymers with cobalt catalysts, and gas barrier layers, such as nylon MXD-6, to prevent spoilage.

As was the case when current technologies were being developed, new technologies testing the bounds of lightweighting solutions may face premarket clearance requirements.

### ***Recyclability of New Packaging***

Innovations, such as the use of gas barrier layers to facilitate lightweighting, can have end-of-life impacts by affecting the recyclability of the finished packaging material.

Indeed, the Association of Plastics Recyclers has issued guidance noting that blends of polyethylene terephthalate, or PET, and other resins designed to enhance properties in the intended first use — e.g., gas barrier layers — require extensive testing to assess potential impacts on recyclability, as some resin blends are deemed incompatible with current recycling technologies.[19]

Further, strict adherence to resin identification code classification has the potential to route modified or heterogeneous packaging systems into the dreaded "7" or "other" category. Materials with this classification are regarded as not recyclable and, in some instances, are prohibited under state EPR laws. For example, S.B. 54 in California bans any nonrecyclable or noncompostable packaging as of 2032.

As discussed above, the stated goals of S.B. 343 in California — which prohibits recyclability symbols on labeling unless materials are recycled at a minimum rate of 60% — are to allow consumers and vendors to make informed decisions about the products they purchase, and to promote greater sustainability in product selection.

However, by mandating that the primary identifier of recyclability, i.e., the chasing arrow symbol, be removed from materials that are capable of being recycled, but simply not recycled at sufficiently high rates, S.B. 343 may unintentionally result in reduced recycling rates for certain types of products, by making consumers question whether a substance is actually capable of being recycled.

Advocates for the bill may simply respond by noting that this will simply result in a shift from packaging materials that are recycled at lower rates to those that are recycled at higher rates.

But such a supposition ignores that packaging materials, especially food packaging materials, are selected for a number of factors, including their physicochemical characteristics — such as gas and water vapor permeability and mechanical strength. These performance criteria are determined through rigorous testing, and are not wholly interchangeable.

Any ill-conceived or poorly informed substitution of a particular packaging material for another has the potential to result in issues such as flavor scalping — i.e., loss in flavor profile at a more rapid rate, resulting in shorter shelf life — potential food safety concerns and increased food waste. These problems may undermine any sustainability achievements.

### ***Recycled Content***

Although many existing packaging materials already contain some recycled content, the use of higher levels of recycled material poses significant challenges for food packaging producers. Many in industry acknowledge that the demand for high-quality recycled materials already far exceeds the supply, and that pricing of this commodity is reflective of this reality.[20]

With premium material in such short supply, industry is being met with a rise of low-quality and potentially adulterated bales of recycled materials not suitable for food-contact use, which demand increased scrutiny and sortation procedures if the material can be used at all.

While more rigorous recycling technologies may be the solution to combat lower-quality bales, a tradeoff exists between the effectiveness of mechanical recycling processes at removing undesirable contamination and the retention of requisite material properties of the base resin. Over time, the repeated recycling of a given material can affect characteristics such as melt flow rate, intrinsic viscosity and color during the recycling process.

Although the increased use of additives to prevent oxidation and other forms of deterioration during recycling may allow for the preservation of necessary material properties over several reprocessing cycles, the regulatory and safety implications of such strategies — particularly for downstream applications involving food-contact materials — will require thorough assessment and approvals prior to implementation.

So-called advanced or chemical recycling processes — such as glycolysis or methanolysis for PET, and pyrolysis or gasification for polyolefins — may be useful alternatives to mechanical recycling to better decontaminate post-consumer recycled feedstocks while preserving ideal

material characteristics.

But such rigorous processes may be unnecessary, cost-prohibitive and limited by the extent of existing infrastructure.

### ***Compostability***

Under S.B. 54 in California, the only alternative to recyclable packaging is to use compostable packaging. California's definition of compostability requires 90% degradation under the ASTM D6400-19 or D6868-19 standards, as applicable.[21]

Unstated in the California legislation is that products need to maintain their functionality. For example, food-contact materials must be able to withstand heat and moisture at the time of use, but also must readily decompose.

Beyond the implications of such factors on the mechanical integrity of such food-contact materials, there are underlying food safety and FDA regulatory issues. Compostable materials are likely to migrate to food at higher levels than other types of packaging.

The frank reality that must be addressed with compostable serviceware is that, even for products that maintain functionality through use, some amount of the food service packaging products are inevitably transferring to the contacted food.

While this does not, in itself, preclude such a use of the subject material, it does highlight the need for thorough life cycle analyses of affected products to understand the extent of migration into food, and a thorough risk assessment of such migration.

Preservation of brand reputation will ultimately require that industry exercises the necessary due diligence to preserve the integrity and safety of the food supply in responding to state initiatives centered on packaging sustainability.

The breadth of products affected, and the ambition of legislative goals, combined with technological challenges and supply chain limitations, will trigger a costly and time-consuming cascade of research and development and regulatory assessments, the scope of which is unparalleled in the packaging industry in recent memory.

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[1] See David Feber, et. al., Sustainability in packaging: US survey insights (2023), <https://www.mckinsey.com/industries/packaging-and-paper/our-insights/sustainability-in-packaging-us-survey-insights>.

[2] H.B. 1541, 130th Leg. (Maine 2021).

[3] S.B. 54, Gen. Assemb., Reg. Sess. (Calif. 2022).

[4] H.B. 22-1355, 74th Gen. Assemb., 2d Reg. Sess. (Colo. 2022).

[5] S.B. 582, 81st Leg. Assemb., Reg. Sess. (Ore. 2021).

[6] H.B. 1131, 66th Leg. Assemb., Reg. Sess. (Wash. 2023).

[7] H.F. 3577, 93 Leg. Assemb., Reg. Sess. (Minn. 2024).

[8] S.B. 2368, 32 Leg. Assemb., Reg. Sess. (Hawaii 2024).

[9] S.B. 3795, 103rd Gen. Assemb., Reg. Sess. (Ill. 2024).

[10] H.B. 4263, 193rd Gen. Assemb., Reg. Sess. (Mass. 2024).

[11] H.B. 1630, Gen. Assemb., Reg. Sess. (N.H. 2024).

[12] S.B. S208, Gen. Assemb., Reg. Sess. (N.J. 2024).

[13] S.B. S4246B, Gen. Assemb., Reg. Sess. (N.Y. 2024).

[14] H.B. H7023, Gen. Assemb., Reg. Sess. (R.I. 2024).

[15] S.B. 0573, Gen. Assemb., Reg. Sess. (Tenn. 2024).

[16] S.B. 343, Gen. Assemb., Reg. Sess. (Cal. 2021).

[17] As an example, in California, laws in addition to the S.B. 54 EPR law include: S.B. 343 (prohibiting use of the chasing arrows sign for many plastics), S.B. 1335 (prohibiting state purchasers from purchasing food service packaging unless it is reusable, recyclable or compostable), A.B. 1200 (prohibiting PFAS in packaging) and A.B. 793 (establishing minimum recycled content standards for plastic beverage containers).

[18] Food-contact materials require premarket clearance when they migrate to food above de minimis levels that are considered to be generally recognized as safe, or GRAS. There is an exemption for premarket clearance for intended uses of a substance when there is adequate publicly available information to support that such exposure may be considered GRAS.

[19] The Association of Plastic Recyclers, PET (2024), <https://plasticsrecycling.org/pet-guidance-table>.

[20] National Association for PET Container Resources, NAPCOR's 2022 PET Recycling Report Demonstrates Bottle-to-Bottle Circularity Continues on the Rise (2023), <https://napcor.com/news/2022-pet-recycling-report/>; Paula Leardini, Recycled PET Prices Trending Down Amid Weak US Demand, *Plastics Today* (2023), <https://www.plasticstoday.com/packaging/recycled-pet-prices-trending-down-amid-weak-us-demand>.

[21] CalRecycle, S.B. 54 Plastic Pollution Prevention and Packaging Producer Responsibility Act Permanent Regulations (2024), <https://calrecycle.ca.gov/Laws/Rulemaking/SB54Regulations/>.