

## Title:

Navigating PPR Policies Through Circular Packaging Design Strategies

## Topics:

Design for Remanufacturing & Recycling for the Circular Economy (primary)  
Building a Sustainable Circular Economy for Materials & Products (secondary)

## Author:

Colin Preston, PhD

Circular Economy and Resource Management at Ramboll

[cpreston@ramboll.com](mailto:cpreston@ramboll.com)

978-877-2545 (cell)

## Abstract:

This paper explores the transformative impact of Packaging Producer Responsibility (PPR) policies on materials design, selection strategies, and the broader implications for supply and value chains in transitioning to circular economy models. PPR policies, a subset of Extended Producer Responsibility (EPR) regulations, shift the burden of managing packaging waste from consumers to producers by imposing fees based on the environmental impact of packaging materials. Producers adopting recyclable, compostable, or otherwise sustainable designs are incentivized through reduced “eco-modulated” fees, encouraging innovation and waste reduction.

State-level PPR legislation in the U.S. has expanded significantly in recent years, the funding from which has catalyzed improvements in recycling and composting infrastructure. However, these policies lack uniformity in compliance requirements and evaluation standards, creating challenges for producers navigating diverse regulatory landscapes. In this paper, we provide an overview of active PPR laws in states like California, Minnesota, Oregon, Maine, and Colorado, alongside a forecast of future PPR policy developments. We also consolidate the various frameworks of eco-modulated fees applied to packaging into an actionable guide for producers. The guide organizes circular packaging design standards and compliance criteria per state into a clear matrix. These resources will help to drive the adoption of circular supply chains, optimized product life cycles, and advanced design approaches that minimize environmental impacts and regulatory costs.

This paper explores potential strategies to align packaging designs with PPR compliance, focusing on circularity principles that reduce waste, protect the environment, and enhance product value. Through case studies, we analyze recyclable packaging solutions that incorporate secondary materials or reduce plastic dependency, alongside renewable materials that advance sustainable designs. Additionally, we examine life cycle extension programs for packaging across the value chains of various consumer-packaged goods, highlighting real-world examples of successful implementations. Finally, this paper reviews recent advancements in infrastructure and raw materials that enable circular design strategies for packaging producers, demonstrating how these developments support innovation and compliance with PPR policies.

In summary, this paper helps producers navigate the complexities of evolving PPR frameworks and provides actionable insights for industry stakeholders integrating regulatory requirements with practical design and material strategies that foster the circular economy.