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**FROM: GARTH HICKLE, BRYCE HESTERMAN, RESA DIMINO - RRS**  
**DATE: 6.3.2020**  
**RE: IMPACT OF EPR FOR PPP ON PACKAGING DESIGN**

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Resource Recycling Systems (RRS) was asked to research several questions generated by the Recycling Steering Committee (RSC) during the framework and scenario review and evaluation process. This is the fourth in a series of memos responding to the RSC's questions. In this memo, RRS presents the results of research on the question of whether extended producer responsibility for packaging and printed paper (EPR for PPP) impacts packaging design. To address this question, the RRS team performed a literature search to identify any academic or other studies documenting changes in packaging design or material choices that result from EPR fees, eco-modulated fees, or the existence of EPR policy for packaging. The team also modeled a hypothetical scenario to quantify the value of eco-modulation incentives to provide some context to consider the question as to whether such incentives would be significant enough to stimulate design choices.

### Research Challenges

The project team was not able to identify any research that either supports or refutes the hypothesis that internalization of the costs of end-of-life management through EPR for packaging creates an incentive for improved environmental performance and design. The Organisation for Economic Co-operation and Development (OECD) reported in 2016 that EPR systems in some jurisdictions have resulted in improvements in eco-design, though the scale of change has been limited<sup>1</sup>. To the extent that the impact of EPR on environmental design has been studied, it has focused on electronics EPR policies (Tojo<sup>2</sup>, Van Rossem<sup>3</sup>)

From a broader perspective, the financial burden for producers participating in many of the EPR programs for packaging, to date, may not be sufficient to drive design given existing supply chain and production dynamics. This is illustrated in the third memo of this series, where the relative cost of EPR fees is in many cases insignificant compared to the price of the products. The dearth of research may be related to the challenges in conducting this type of analysis related to packaging, including:

- 1) The importance of identifying and controlling for other regulatory requirements that may be in place (e.g. product / material restrictions, taxes)
- 2) The lack of publicly available data, or specific data (by product and/or material type), to facilitate comparative analysis
- 3) The lack of consistency of EPR programs and fee schedules, with the producers' programmatic and financial responsibilities varying by jurisdiction.
- 4) The lack of consistency among jurisdictional EPR for packaging programs related to desired design outcomes inhibits clear signals to brand owners regarding the prioritization of the use of recycled content, recyclability, reduction of additives, or other attributes.

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<sup>1</sup> OECD. (2016). *Extended producer responsibility - updated guidance*. env/epoc/wprpw(2015)16/final

<sup>2</sup> Tojo, N. (2004). *Extended producer responsibility as a driver for design change-utopia or reality?*. Lund University.

<sup>3</sup> Van Rossem, C. (2008). *Individual producer responsibility in the WEEE directive. From Theory to Practice*. Lund University.

## Evidence of EPR Affecting Design Choices

CITEO, the compliance organization in France, implemented eco-modulated fees (incentives / penalties) to influence producer design choices. The data reported by CITEO indicates that this approach holds promise for directing sustainable design decisions by providing targeted incentives and disincentives linked to the fee structure.

Eco-modulation is a relatively new tool structured into EPR systems. Through CITEO, France is generally considered to be a leader in this approach. Under a recent EU directive, all of the member-states will be required to implement eco-modulated fees by January 5, 2023.<sup>4</sup> In Canada, Quebec has incorporated some eco-modulation, but it is not as extensive as it is in France. No other EPR programs in Canada have eco-modulation beyond the base fee structure that is based on weight. Table 1 lists the incentives and penalties imposed by the CITEO program. More information and specific examples can be found in the 2019 CITEO [Packaging](#) Declaration Guide and [Paper](#) Declaration Guide.

Table 1. 2019 CITEO Eco-Modulation Schedule

Awareness-Raising	Incentive
Sorting info on or in package	8%
Sorting guidelines through QR code	4%
Triman logo (indicating recyclability)	5%
Media campaigns	4%
Eco-design	Incentive
Reduction in packaging weight	8%
Reduction in packaging volume	8%
Use of refills	8%
Elimination of a packaging unit	8%
Removal of a material from multi-material packaging	8%
Replacement of multiple resins with mono resin	8%
Addition of perforation on plastic sleeves	8%
Removal of carbon black dye	8%
Recyclable plastic	Incentive
Bottles and vials for which there is a recycling channel	12%
Rigid plastic that can join an existing recycling channel	8%
Recycled Content	Incentive
Polyethylene or Polypropylene with at least 50% recycled material <sup>5</sup>	50%
Paper product with at least 50% recycled material	10%
Disruptor Fee	Penalty
Specifically defined disruptive packaging	50%
Opaque PET packaging	100%
Packaging without a recycling channel	100%
Dyed paper	5%
Untraced fiber	10%
Kraft paper	5%
UV offset ink	5%
Flexographic printing	5%
Inkjet printing	5%
Use of glue	5%
UV varnish	5%
Moisture resistant coatings	5%
Non-paper inserts	5%

<sup>4</sup> [https://eur-lex.europa.eu/resource.html?uri=cellar:c2b5929d-999e-11e5-b3b7-01aa75ed71a1.0018.02/DOC\\_1&format=PDF](https://eur-lex.europa.eu/resource.html?uri=cellar:c2b5929d-999e-11e5-b3b7-01aa75ed71a1.0018.02/DOC_1&format=PDF)

<sup>5</sup> Recycled content incentives for plastics were added in 2019 for Polyethylene and in 2020 for Polypropylene.

The following data from CITEO illustrates a correlation between certain incentives / penalties and packaging design choices. The data from these charts come from the reported packaging declared by producers from which their fees are calculated.

For example, CITEO provides an incentive for product labeling that communicates how to handle the package at its end of life. Figure 1 shows the increase in the amount of packaging that includes sorting guidance between 2012 and 2015. While the incentive provided is modest, and translates to a fraction of a cent per package, the data indicates that either the signal is effective, or there are other drivers motivating this change.

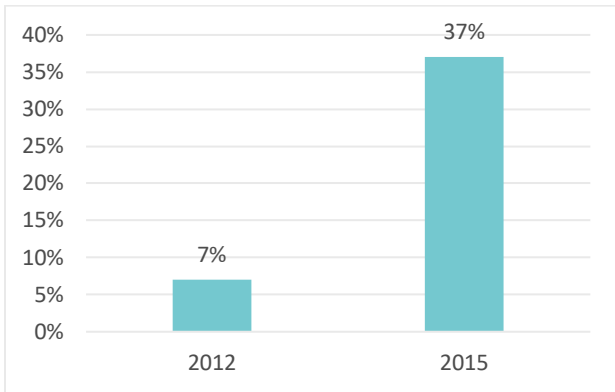


Figure 1. Increase in Packaging with Sorting Instructions

The most aggressive eco-modulation signals are associated with penalties for the use of materials (disruptors) that pose challenges for recycling. Figure 2 and Figure 3 shows a reduction in targeted materials (PVC bottles and PET bottles with aluminum closures) that were identified as disruptive.

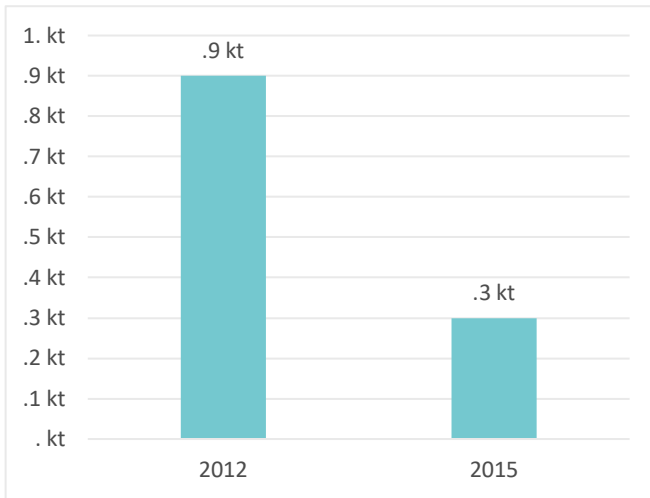


Figure 3. Decrease in Clear PVC Bottles (in kilotons)

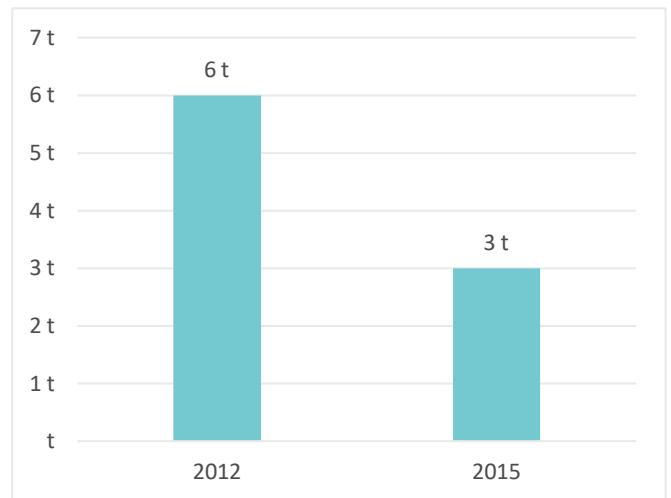


Figure 2. Decrease in PET bottles with Aluminum (in tons)

Figure 4 illustrates the increase in the percent of packaging (by weight) that has experienced weight reduction, while maintaining the same volume of product, between 2012 and 2015.

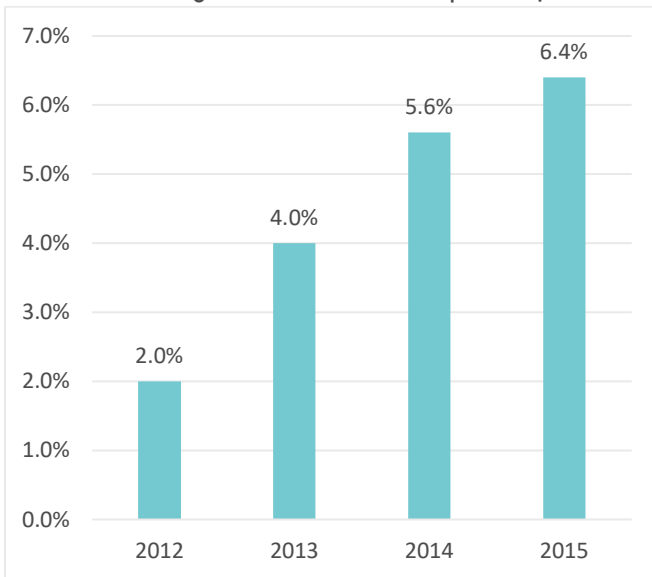


Figure 4. Percent of Packaging (by weight) Receiving Source Reduction Incentive

Figure 5 shows the increase in printed paper that incorporates greater than 50% recycled content. Plastic recycled content incentives were only introduced in 2018, so there is no data yet available.

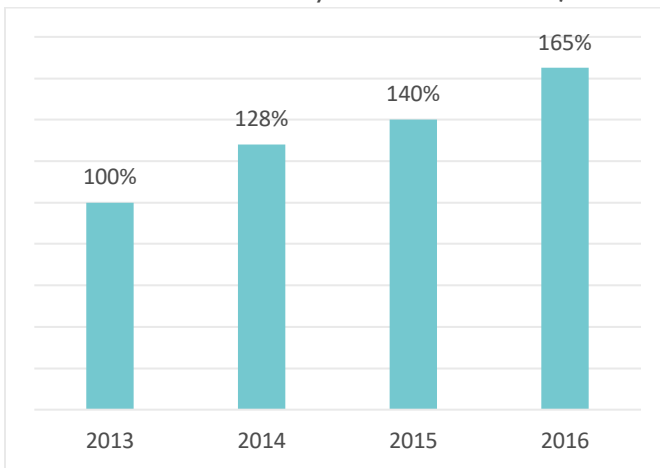


Figure 5. Increase in Recycled Content

In sum, though use of eco-modulated incentives is not presently commonplace amongst EPR programs for printed paper and packaging, there does appear to be an impact of eco-modulated incentives on packaging design. The examples quantified by CITEO represent three types of actions:

- Simple or common actions, or low hanging fruit (e.g., sorting instructions, printed paper recycled content)
- Actions that provide corresponding external financial incentives (e.g., reduction in material use)
- Aggressive incentives (e.g., disruptor penalties of 50 to 100 percent)

## Quantifying Eco-Modulation Incentives

To provide insight into the financial signals that existing incentives provide for packaging design decisions, RRS sought to quantify the value of several eco-modulation incentives. The incentives are presented on a dollars-per-pound basis since that mirrors how supply chain decisions are measured.

Table 2 presents this information in a hypothetical scenario. This scenario takes EPR fees calculated for four different packages sold in British Columbia<sup>6</sup> and evaluated in the previous memo provided to the RSC (*Impact of EPR for PPP on the Price of Consumer Packaged Goods*) and overlays four different incentives outlined in the France CITEO fee structure presented in Table 1. The scenario assumes that the four products listed change their packaging design to earn the listed incentives. It is important to note that BC does not have such incentives in place. This scenario is used to provide a reference point for the potential signals that eco-modulation could send based on the most aggressive use of fees studied in the third memo and incentives as structured by CITEO.

The data in Table 2 demonstrates that these incentives provide defined financial benefit on a cost-per-pound basis. Most of the incentives are marginal, but still may provide a financial justification since some activities are fairly simple (e.g., printing a QR code) or are related to other economic benefits (e.g., source reduction). The strongest signal in this scenario is clearly for 50% minimum recycled content in a polypropylene tub, which provides a financial incentive of \$0.18 (USD) per pound to create a pull-through demand signal that supports the recycling of polypropylene.

It should also be noted that just as the examples in Table 2 represent a purely hypothetical scenario (CITEO incentives applied to British Columbia base fees), EPR programs could eco-modulate fees in still different ways, including more ambitious incentives and penalties that could send stronger price signals to producers than the examples shown in Table 2.

Table 2 Quantification of Eco-Modulation Incentives Based on CITEO model

Eco-modulation Incentive Scenario						
Product	EPR Fee Based on BC Schedule	Incentive Type	Incentive Amount	Incentive per Unit \$ (CAD)	Weight of Package (g)	Incentive Converted to \$(USD)/lb.
Colgate Total Mouthwash (1L) (PET bottle)	\$ 0.05	Reduction in packaging weight	8%	\$ 0.004	63	\$ 0.02
M&M's (330g) (stand up pouch)	\$ 0.01	Replacement of multi-resin with mono-resin	8%	\$ 0.001	7	\$ 0.04
Earth Balance Butter (425g) (PP tub)	\$ 0.02	At least 50% recycled content	50%	\$ 0.010	18	\$ 0.18
Campbell's Chicken Broth (900ml) (carton)	\$ 0.03	Sorting Guidelines through QR code	4%	\$ 0.001	33	\$ 0.01

<sup>6</sup> RRS did not have the means to calculate the CITEO fees and instead used BC fees in this scenario

## Conclusion

The limited examples from the packaging program in France, and in the scenario explored above, demonstrate that EPR can be helpful in stimulating design change within the packaging sector. However, it is clear that most EPR programs for packaging, to date, have emphasized improving collection, expanding, and upgrading processing infrastructure and encouraging participation, with less focus on impacting material choices and packaging design. Programs that seek to impact design will need to intentionally embrace policy choices and implementation strategies that align with that objective, as CITEO has. Incentives and disincentives must be significant enough to influence choices, and program administration and decision making should be structured to support consolidated decision-making (e.g. fee setting) for design for environment outcomes.