



Oregon Department of Environmental Quality

Rule Concepts: Life Cycle Evaluation of Covered Products

Plastic Pollution and Recycling Modernization Act (SB 582, 2021)
Rulemaking Advisory Committee Meeting 5, Rulemaking 2

Feb. 1, 2024

Background

This memo provides background information and rule concepts for the Rulemaking Advisory Committee to consider on the life cycle evaluation requirements described in ORS 459A.944 (Life cycle evaluation; rules). The Oregon Environmental Quality Commission shall establish by rule the methodology, procedures, and requirements to be used by producers of covered products when evaluating life cycle environmental impacts. Evaluations will be complete in compliance with these rules conducted by producers of packaging, printing and writing paper, and food serviceware (covered products). The resulting information will be used by the top 25 largest producers in the state to evaluate and disclose impacts, and can be used by all producers to qualify for graduated (referred to as “ecomodulated”) fee bonuses (see ORS 459A.884(4)).

DEQ seeks feedback from RAC members on ten rule concepts broken into two groupings:

1. Clarifying rules: one concept for the large producer disclosure and one for ecomodulation; and
2. Product Category Rules: eight concepts.

Purpose

A summarized listing of the ten rule concepts follows below. Collectively, DEQ intends for these rules to achieve the following objectives:

- Drive maximum producer disclosure of environmental impacts of covered products, which DEQ research has found to reduce impacts,
- Direct [ecomodulation toward system change](#) for impact reduction, by mandating bonuses based on the evaluation of environmental impacts,
- Build an Oregon-specific assessment methodology (a product category rule for products covered under Oregon’s laws). The assessment should leverage existing methodologies but also limit flexibility to influence assessment outcomes through methodological choices, thereby facilitating more accurate comparisons across products, and
- Account for emerging impacts not traditionally well-covered by life cycle assessment including plastic pollution and toxicity, either by requiring the use of new assessment methodologies or by requiring additional producer disclosures to inform future approaches.

These objectives serve broader goals to:

1. Better align Oregon’s recycling system with the environmental outcomes prescribed by [Oregon’s 2050 Vision for Materials Management](#).
2. Address relevant gaps in existing standards governing the life cycle evaluation of products.
3. Initiate the process of calculating and disclosing environmental impacts for covered products as part of the shared responsibility model of the Recycling Modernization Act. These rules will likely require future updates as science and our understanding continues to evolve.

DEQ vetted these rule concepts with a [Rulemaking Advisory Panel](#) comprised of four experts in the field and with interested parties through a two-part Request For Information process. Feedback received to date is summarized in the [Background Document: Guidance on Ecomodulated Fees](#).

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Rule concepts for discussion at Feb. 14, 2024 RAC meeting

I. [Clarifying rules on the large producer disclosure requirement \(ORS 459A.944\)](#)

Statute requires that large producers evaluate and disclose environmental impacts for one percent of their covered products sold into Oregon. DEQ proposes to clarify this requirement by requiring large producers to disclose environmental impacts of the top one percent of their Stock Keeping Units ranked by sales volumes (quantity, not revenue) on a biennial basis with the first deadline set as Dec. 31, 2026. For subsequent deadlines (every two years), producers must disclose impacts for the next one percent of SKUs and so on, with no SKU reassessed during any ten-year period (for purposes of meeting the disclosure requirement, not ecomodulation).

II. [Clarifying rules on ecomodulation \(ORS 459A.884\(4\)\)](#)

DEQ proposes to mandate that PRO(s) make two ecomodulation bonuses available to member producers:

- a simple bonus for voluntary disclosures capped at 100 SKUs per producer; and
- a larger bonus for producer actions that achieve “substantial impact reduction” measured using the product category rules.

DEQ proposes to use impact categories, normalization factors, and weighting factors from [the European Commission’s Product Environmental Footprint Category Rules \(PEFCR\) methodology](#), with the following modifications:

- include a factor for the impact of plastic impact on ecosystems with an Oregon-specific, custom weighting; and
- reward 10 percent and larger impact reduction with progressively larger bonuses, through a tiered bonus scheme.

In alignment with the PEFCR methodology, toxicity impacts would be excluded from the bonus analyses due to high methodological uncertainty that exceeds the bonus thresholds.

PROs could propose additional ecomodulation criteria as part of their program plans.

III. [Core product category rules for evaluation of the life cycle impacts of covered products](#)

DEQ proposes to put into rule an Oregon-specific PCR that would be used by producers as the assessment method for the large producer disclosures and ecomodulation bonus assessments. In the 2024 rulemaking, DEQ proposes to require only life cycle assessment, although additional methods including embedded toxics assessments and environmental justice considerations could be added in subsequent rulemakings.

IV. [Life Cycle Impact Assessment](#)

DEQ proposes a rule requiring large producer disclosures and bonus assessments to include impact assessment that follows the PEFCR methodology, incorporating the standard 16 impact categories. This includes evaluating three toxicity-related impacts, for which analysis would be conducted but for which results would not factor into the substantial impact reduction bonus.

To receive the substantial impact reduction bonus, a producer must assess a seventeenth impact category, the physical effects of microplastics on ecosystems. This category is optional for other assessments.

DEQ also proposes requiring producers to report on hazardous waste generation and hazardous substances embedded within products using indicators from ISO 21930.

V. [Life Cycle Inventory – plastic leakage](#)

To assess plastic impact on ecosystems, producers must report flows of plastic in and out of covered product systems. DEQ proposes to clarify that producers must use apply [Plastic Footprint Network](#) methodologies for this reporting.

VI. [Life Cycle Inventory – methane leakage](#)

The problem of methane leakage from fossil fuel systems (e.g., from natural gas wells and through distribution) can result in substantial undercounting of climate impacts in LCA, particularly for products made of plastic and other polymers. LCA inventories are being updated to account for this problem and those updates should be complete at the Act's start date.

DEQ proposes a rule that would mandate the use of data that represents the latest and best understanding of the methane leakage problem.

VII. [Evaluation of Covered Products that are Reusable](#)

DEQ proposes a specific methodology for producers to assess environmental impacts of reusable products. To apply the substantial impact reduction bonus, this methodology includes a grace period of three years. During this period producers may use projections for several key parameters; thereafter, projections must be replaced with actual data. The grace period will allow environmentally-beneficial reuse programs a start-up period, but will curb a producer from continuing to claim a bonus for reuse that did not realize reductions in environmental impacts.

VIII. [Scenario Analysis](#)

To perform its oversight role, DEQ seeks data to examine error and variability both within individual assessments and across assessments from multiple producers. DEQ proposes a rule requiring producers to conduct scenario analysis for impact hot spots. Under this requirement, the analyst will be required to model several scenarios for the electricity grid used for production, and will be required to apply several methodologies to allocate the benefits of recycling. For these and other impact hot spots subject to scenario analysis, the producer will represent the range, minimum and maximum of outcomes.

IX. [Recycling Allocation Procedures](#)

Applying different accounting methods for allocation of the environmental benefits and detriments of recycling may cause inconsistency in LCA outcomes. DEQ proposes rules to require producers to disclose the underlying methodology applied and to ensure that benefits are not counted twice. For example, one may not reduce upstream impacts through the "cut off" approach while simultaneously taking credits at end of life through "system expansion." In subsequent rulemakings DEQ may issue more detailed requirements, including requirements specific to material type and recycling type.

X. [Biogenic Carbon Accounting](#)

DEQ proposes to exclude flows of biogenic carbon, or carbon from biomass, (e.g. in products such as paper, compostables, and bio-plastics) from the calculation of the substantial impact reduction bonus. This aims to reduce the methodological flexibility for climate outcomes, and account for the short life spans of most covered products containing biogenic carbon under the Act.

Appendix A: Statutory References

The statutory excerpts relevant to the rule concepts are as follows:

ORS 459A.944 Life cycle evaluation; rules. *The Environmental Quality Commission shall establish by rule standards for the evaluation and disclosure of the environmental impacts of covered products through the life cycle of the products. Rules adopted under this section must:*

- (1) Establish procedures and requirements to be used by producers when evaluating the life cycle impacts of covered products to obtain an incentive under ORS 459A.884 or when required to do so under subsection (2) of this section.*
- (2) Require large producers to:*
 - (a) Once every two years, perform an evaluation of the life cycle impacts of at least one percent of covered products that the large producer sells or distributes in or into this state;*
 - (b) Provide the results of the evaluation to the Department of Environmental Quality; and*
 - (c) Make the evaluation available on the website of the producer responsibility organization of which the large producer is a member. [2021 c.681 §33]*

ORS 459A.884(4) *In addition to the base fees described in subsections (2) and (3) of this section, a producer responsibility organization's membership fee schedule must incentivize producers to continually reduce the environmental and human health impacts of covered products by offering fee adjustments to producers that make or have made changes to the ways in which they produce, use and market covered products. Fee adjustments developed under this subsection must include lower fees for covered products with a lower environmental impact and higher fees for covered products with a higher environmental impact. In establishing the criteria for the graduated fee structure, a producer responsibility organization must consider factors that include, but are not limited to:*

- (a) The post-consumer content of the material, if the use of post-consumer content in the covered product is not prohibited by federal law;*
- (b) The product-to-package ratio;*
- (c) The producer's choice of material;*
- (d) Life cycle environmental impacts, as demonstrated by an evaluation performed in accordance with ORS 459A.944; and*
- (e) The recycling rate of the material relative to the recycling rate of other covered products.*

Appendix B: Detailed Information for Rule Concepts

DEQ provides additional technical information below about each of the 10 rule concepts summarized in the Executive Summary to enable RAC members to provide feedback on more technical aspects of the concepts:

- I. [Clarifying rules on the large producer disclosure requirement \(ORS 459A.944\)](#)
- II. [Clarifying rules on ecomodulation \(ORS 459A.884\(4\)\)](#)
- III. [Core product category rules for evaluation of the life cycle impacts of covered products](#)
- IV. [Life Cycle Impact Assessment](#)
- V. [Life Cycle Inventory – plastic leakage](#)
- VI. [Life Cycle Inventory – methane leakage](#)
- VII. [Evaluation of Covered Products that are Reusable](#)
- VIII. [Scenario Analysis](#)
- IX. [Recycling Allocation Procedures](#)
- X. [Biogenic Carbon Accounting](#)

I. Clarifying rules on the large producer disclosure requirement (ORS 459A.944)

Statute requires that large producers evaluate and disclose environmental impacts for one percent of their covered products sold into Oregon. This large producer disclosure requirement requires rules for implementation to clarify the scope of the disclosure, the first deadline for disclosures, and the requirements for subsequent disclosures. (i.e., can a producer just update prior disclosed assessments, or must it issue disclosures for an additional one percent of products?).

The disclosure requirement in statute was informed by [prior DEQ research](#) showing that impact disclosure correlates with actual action to reduce impacts. DEQ proposes defining these rules to enable disclosures for a maximum number of the most environmentally-impactful products. Over time, the disclosure requirement will also provide a repository of assessments that will allow for feedback to and improvement of the ecomodulation and product category rules (i.e., rule concepts II-X in this document).

- **Defining “one percent”:** DEQ proposes defining one percent of a producer’s covered products as one percent of the unique SKUs sold by the producer in or into the state. To determine which one percent of products to disclose impacts for, a producer would order its SKUs by Oregon sales volumes and take the top one percent of SKUs.

Batch assessments can be performed covering multiple SKUs that represent covered products of like materials, but different sizes that fulfill the same function (e.g. products within the same product line or product family, such as paperboard cereal boxes of different sizes), with out-of-order SKUs covered by the batch assessments also counted toward the one percent.

Assessments for a given SKU would encompass any secondary and tertiary packaging that is associated with that SKU, as well as the primary packaging for covered products.

- **Calendar for the large producer disclosure:** The first one percent batch of assessment and disclosure must occur by a deadline of Dec. 31, 2026, except for producers who were not among the top 25 producers by interim market share published in September 2025, but then appeared in the updated ranking published in August 2026. These producers will be given an additional six months (i.e., until June 30, 2027) to assess and disclose.

Subsequent deadlines will occur at two-year intervals (e.g. Dec. 31, 2028; Dec. 31, 2030, etc.) and will use rankings published in the prior year. For example, in August 2027 DEQ will publish a top 25 ranking using producers’ 2026 data. The top 25 producers in that ranking must conduct the required disclosure by the Dec. 31, 2028 deadline.

- **Requirements for subsequent disclosure:** If they are still a large producer two years later, the subsequent disclosure must not duplicate SKUs from the prior disclosure. SKUs should be ranked again by Oregon sales and the next one percent that has not already been assessed should be selected.

SKUs that have already been assessed may be repeated after 10 years, or earlier if all SKUs have been assessed. Updates to assessments disclosed for previous deadlines are encouraged, but would not count toward the one percent requirement for a given year.

Discussion Prompts

- 1.1. How can the allowance for batch assessments be effectively designed to limit the products covered by a batch assessment to those that are part of the same product line or family?
- 1.2. Are there large producers for whom the SKU-based approach would not work and for which an alternative approach should be defined in rule?
- 1.3. Are Oregon sales volumes an appropriate proxy for relative environmental impact of a particular producer's product? i.e., by having producers rank their SKUs by sales volumes and then disclose impacts of the top one percent, will we be capturing the most environmentally-impactful covered products? If not, is there another metric that would better identify the most impactful covered products for a given producer?

II. Clarifying rules on ecomodulation (ORS 459A.884(4))

Per ORS 459A.875(2)(a)(F) and ORS 459A.884(4), PRO(s) in their program plan will propose an approach to ecomodulation of producer fees that continually incentivizes reductions to environmental and human health impacts of covered products. Statute does not restrict the criteria nor the magnitude by which a PRO may propose to ecomodulate fees, except that the ecomodulation must reduce impacts. Statute only identifies five factors that must be taken into consideration, and it requires that PROs *consider* those factors. While statute does not place additional restrictions on the PRO(s), it is not precluded that this could be done in rule, and this is what DEQ is proposing in this rule concept. DEQ considers it appropriate to mandate bonuses based on life cycle impact evaluation, to meet the statute's mandate that ecomodulation continually incentivizes producers' "reduc[tion] of the environmental and human health impacts of covered products."

DEQ proposes the following rule concepts:

- PRO(s) must include in their ecomodulation algorithm a bonus for producers' voluntary disclosures of the life cycle impacts of covered products. Results of these disclosures must be made available on a PRO website and submitted to DEQ, as with the large producer disclosures. Within any given program year, producers may claim bonuses for up to 100 SKUs for which a life cycle evaluation is performed and disclosed.
- The PRO(s) ecomodulation algorithm must include a larger bonus for producer actions that reduce the life cycle impacts of covered products and for which the reduction is quantified using the evaluation standards and methods set in rule. This bonus can be claimed if:
 - The change resulting in reduction of life cycle impacts has been undertaken directly by the producer (or its suppliers).
 - The change has already been implemented and a substantial reduction in impacts is indicated through impact assessments of two scenarios (before and after).
 - A substantial reduction in impacts is defined as a ten percent, or more, reduction in normalized/weighted results, which aggregate 14 impact categories cumulatively into a single score.
 - The 14 impact categories that will factor into the overall impact assessment are drawn from the 16 required for inclusion in any assessment conducted according to this PCR (see [Rule](#)

[Concept 4](#)). This excludes the three toxicity-focused impact categories, for which error is too large to account in applying the bonus, plus the emerging impact category of plastics physical effects on ecosystems.

- DEQ proposes to apply the normalization and weighting factors derived as part of the Product Environmental Footprint Category Rules (PEFCR) developed by the European Commission (see Annex A [here](#)). DEQ proposes to determine appropriate normalization and weighting factors for plastics physical effects on ecosystems, then proportionally reduce the weighting of the other 13 impacts.
- The bonus must be applied in a tiered structure (e.g. a 10 percent reduction in normalized/weighted score results in a smaller bonus than a 20 percent reduction, which results in a smaller bonus than a 30 percent reduction, etc.) starting at 10 percent impact reduction, with greater levels of impact reduction receiving progressively larger bonuses, not to exceed 5 bonus tiers. For example:
 - Tier 1 - between 10-20 percent reduction
 - Tier 2 - between 20-30 percent reduction
 - Tier 3 - between 30-40 percent reduction
 - Tier 4 - between 40-50 percent reduction
 - Tier 5 - > 50 percent reduction

Discussion Prompts

- 2.1. Should there be a limit on how long ago a significant impact reduction action has been taken by a producer to qualify for a bonus? And for how many years should a significant impact reduction bonus be awarded to a producer?
- 2.2. Some producers have questioned the bonuses that reward impact reduction actions taken after the start date of the Act, rather than previous actions, and rewards producers in comparison with their own prior behavior rather than rewarding the best in class for a particular product type (which would require much more detailed rules that exceed the bandwidth of this rulemaking). DEQ considers that there are trade-offs here between environmental impact reduction and fairness and is proposing to emphasize impact reduction. Is this justified?
- 2.3. For the substantial impact reduction bonus, how should the impact of plastics on ecosystems be weighted alongside other impact categories? Is it more or less impactful than others (e.g. climate change)? How would you rank it? Weighting necessarily involves some subjectivity, as it reflects the perceived relative importance (a value judgement) of the impact categories included in the cumulative single score.
- 2.4. Taken together with all the PCR rule concepts (III-X of this document), can you predict any negative incentives that could award a bonus to a producer for actions that should not be rewarded?

III. Core product category rules for evaluation of the life cycle impacts of covered products

DEQ proposes to clarify the requirements and guidelines to be followed when evaluating the life cycle performance of covered products. DEQ proposes to design these rules as a core PCR that includes all covered products under the RMA. PCRs, if written in ways that reduce flexibility and interpretation, can allow for verifiable and consistent reporting across diverse assessments within a given product category, thereby improving consistency and enabling comparability.

In subsequent rulemakings, separate PCRs that are specific to sub-categories of covered products may be developed, but for this initial rulemaking on this topic, due to capacity and time limitations, DEQ proposes to develop a single core PCR.

There is no globally-accepted PCR that:

- a) focuses on the particular suite of products covered under the RMA,
- b) adequately limits flexibility on the part of the practitioner so as to generate reliable comparisons, and

c) accounts for emergent impacts and particularly impacts of plastic pollution in an adequate manner. Therefore, DEQ proposes to develop a PCR unique to Oregon. DEQ proposes to draw content from various existing international standards and PCRs to limit duplication. ISO 21930, a PCR for construction products, will inform the basic underlying structure of the rules. Rule content will also be drawn from the European Commission’s PEFCR, specifically to inform the impact assessment categories and normalization/weighting approach to results. Additionally, DEQ proposes to draw from ISO 14025, ISO 14040, ISO 14044, and ISO 14067, all of which are international standards pertaining to guidelines and methodology in LCA.

DEQ proposes that the rules will only require outputs and results LCA and not of other types of assessments or tools. Among examples of non-LCA assessments that have been proposed by interested parties as requirements to include in these rules are environmental justice mapping of supply chains and embedded toxicity and/or alternatives assessments. If there were such requirements, they would appear within the ISO 21930-derived outline in the Additional Environmental Information, Section 9.6.

DEQ proposes to use *functional units* as the reference unit for which the assessment should be conducted and the results should be reported, consistent with Section 7.1.3 of ISO 21930.¹ Functional units need to be used to facilitate product comparisons. While DEQ is not proposing rules that would compare products across different producers with one another, comparisons of different covered products serving the same function and produced by the same producer could be undertaken under [Rule Concept II](#) by a producer seeking a substantial impact reduction bonus—for example, in the case of a producer that has implemented a change to an alternative material, or has switched from single-use to reuse. In such a case, it is important that the two compared scenarios would use the same functional unit of reporting.

To support producers’ choice of the appropriate functional unit, DEQ proposes to include in the rules a list of product categories covered under the Product Category Rule and an appropriate functional unit for each covered product.

Discussion Prompts

- 3.1. Do you support the proposed approach of developing an Oregon-specific, general PCR for covered products under the RMA? What are the limitations or benefits of this approach?
- 3.2. Do you support the approach of beginning the program with requirements based solely in Life Cycle Assessment methodologies? Why or why not? What other tools or methods would you like to see included?

IV. Key PCR Aspect #1² - Life Cycle Impact Assessment

To address concerns that LCA does not incorporate a comprehensive set of environmental impacts, particularly those that are emerging environmental areas of concern, DEQ proposes to require assessment of 16 environmental impacts included in PEFCR (also known as Environmental Footprint or EF 3.2) and using the methods prescribed by PEFCR. The PEFCR also includes a methodology for normalizing and weighting these 16 impact results into a single score. These rules will prescribe the use of this methodology and its associated normalization and weighting factors, in addition to reporting the 16 midpoint indicators. When the additional impact category related to plastics litter is evaluated, DEQ will derive a specific normalization/weighting factor, and rebalance the PEFCR factors to include this additional category. The inclusion of this impact category is only required when seeking the “significant reduction” bonus described in [Rule Concept II](#) above.

¹ *Declared units* represent a fixed quantity of a covered product used, e.g. 1 ton, 1 item, 1 foot of [a given covered product]. *Functional units* represent the material used to fulfill a particular function for a particular quantity, quality and duration e.g. one disposable beverage cup fit for serving 180 ml hot drinks dispensed by vending machines. Functional units are particularly relevant for packaging and food serviceware since different sizes can provide different functions. For example, evaluating a 4-oz bottle against an 8-oz bottle might reveal that the 4-oz bottle, due to its smaller size, has a carbon footprint that is 40 percent smaller. However, twice as many bottles are required to deliver the same quantity of product, an important dynamic that is addressed by the use of functional units.

² This and all remaining rule concepts in this document focus on key aspects within the Product Category Rule for covered products.

The 16 PEFCR impact categories are:

1. Climate change,
2. Ozone depletion
3. Human toxicity, cancer*
4. Human toxicity, non-cancer*
5. Particular matter
6. Ionizing radiation, human health
7. Photochemical ozone formation, human health
8. Acidification
9. Eutrophication, terrestrial
10. Eutrophication, freshwater
11. Eutrophication, marine
12. Ecotoxicity*, freshwater
13. Land use
14. Water use
15. Resources use, minerals and metals
16. Resource use, fossils

*Toxicity impact categories that are proposed to not factor into the significant impact reduction bonus calculation (due to high uncertainty) are marked with asterisks.

In addition to the reporting and assessment methods required under PEFCR, DEQ also proposes to require mandatory reporting of a select set of inventory indicators taken from ISO 21930 (see list below).

- Two indicators describing waste categories and output flows related to waste (the following subset drawn from ISO 21930 Section 7.2.14):
 1. Hazardous waste disposed
 2. Non-hazardous waste disposed
- Disclosure/release of any hazardous substances which are part of/embedded within the covered products assessed, consistent with the requirements of sections 8.4.1 and 8.4.2 of ISO 21930.

Additionally, DEQ proposes to include, as optional, emerging impact categories and methodologies (as “additional environmental information”) including, but not limited to:

1. [S-LCA \(Social LCA\) indicators](#)
2. LCIA based on Planetary Boundaries, as described in [Bjorn et al. 2020](#).
3. Damage cost factors through natural capital accounting, as described in [Rugani et al. 2023](#).
4. [MariLCA](#)³ plastic ecosystem impacts (note – this methodology is required if a producer is seeking a significant impact reduction bonus).

Discussion Prompts

- 4.1. Does the approach to prescribe a set of impact factors and methodologies based on PEFCR make sense? What are the limitations or benefits of this approach?
- 4.2. The PEFCR methodology includes a weighting scheme, to try to make sense of multiple disparate impact categories in a single score. This weighting scheme, summarized on page 5 of [Sala et al. 2018](#),

³ MariLCA staff indicated to DEQ on 6/21/23 that methods for assessing physical impacts of micro- and nanoplastics on marine biota are expected to be ready for use at the program start date of July 1, 2025. Over time, additional impact assessment methods will come online that will encompass impacts of macroplastics and additionally address ecotoxicity and invasive species impacts of plastics (both for micro/nanoplastics and macroplastics). Thus, inclusion of the impact category of “plastic ecosystem impacts” in Oregon’s PCR would serve as a placeholder for MariLCA-sourced methodology that would come online over time.

was developed through a consensus-based survey of scientists and experts. Do you agree with the relative “importance” granted to each impact category through this weighting scheme? Why or why not?

- 4.3. Are the methodologies to evaluate emergent impacts sufficient or deficient? Should they be allowed to be optional?

V. Key PCR Aspect #2 – Life Cycle Inventory – Plastic leakage

Plastic pollution and litter can occur throughout the life cycle of a covered products. Often these flows of plastic can go untracked. DEQ recommends quantifying the flows of plastic materials into and out of the production system for relevant covered products using methodologies of the Plastic Footprint Network.⁴ This will allow quantification of all plastic leakage across the life cycle of a covered project and support classification and characterization of plastic leakage in terms of emergent impact methodologies, such as MariLCA.

Discussion Prompts

- 5.1. DEQ originally considered a requirement for primary and secondary data on plastic leakage but has removed it from this iteration due to the limited amount of such research and tracking currently being accomplished. Is it reasonable and necessary for producers of covered products to obtain and track this information?

VI. Key PCR Aspect #3 – Life Cycle Inventory – Methane leakage

DEQ received input from interested parties stating that climate impacts of petrochemical processes involved in the production of plastic and other polymer-based products are underrepresented by up to 30 percent in conventional life cycle assessments. DEQ heard concerns that inventories for polymer production have not yet been updated to account for the problem of methane leakage, which can occur at various points across the life cycle of particular covered products (at the wellhead, pipeline, transport, refinery, and production facilities). Methane, as a potent greenhouse gas, is particularly relevant in addressing climate change in the short term. Commonly used oil and gas inventories have recently been updated to apply correction factors for methane leakage at the extraction step. Comparable updates are yet incomplete for polymer inventories, but these should be done in time for the RMA start date.

DEQ proposes to require producers to use inventory data that has been updated to reflect the latest understanding of the problem of methane leakage.

Discussion Prompts

- 6.1. As part of the 2023 Request for Information process, DEQ previously proposed requiring reporting of primary and secondary data (e.g. actual plant data versus emissions factors) to explore this problem further and/or use of the [MiQ Highwood Index](#) to verify data. Does limiting the rule to requiring the latest data address the issue sufficiently?

VII. Key PCR Aspect #4 – Evaluation of Covered Products that are Reusable

Some covered products may be reusable. To ensure consistent evaluation, DEQ recommends developing specific rules for conducting impact assessments for reusable covered products. In addition to the general rules of life cycle evaluation based on ISO 21930:2017, DEQ proposes to identify in rule key parameters⁵ for evaluation of reusable covered products. These parameters will include, at a minimum:

- A system boundary based on the full life cycle including:
 - Use-phase variables that are clearly articulated and justified, including:

⁴ The Plastic Footprint Network [methodologies](#) were developed through a multistakeholder effort that built upon a foundation of Quantis' [Plastics Leak Project](#).

⁵ These parameters are derived from PR3's [Reusable Packaging System Design Standard](#).

- Customer transportation for return (mode/distance)
- Washing and sterilization process
- Return Rate – factor to account for breakage, losses, or yield across each reuse cycle
- Expected number of reuse cycles (examined through scenario analysis)

Under the proposed rules, if a producer transitions a covered product from single-use to reuse and seeks the substantial impact reduction bonus for this action, projections rather than actual data could be used for key parameters for the first three years. Thereafter, a producer would need to use actual data. The three-year period is intended to allow producers a grace period to improve use-phase efficiencies and return rate and incentivize positive change, while acknowledging that an effective reuse system takes time to build.

“Reusable product” will need to be defined in these rules so that, for example, reusing a yogurt cup as a pencil holder would not qualify as “reuse” under the rules. DEQ proposes to define “reusable product” as a product that is:

- a) designed for reuse,
- b) durable,
- c) supported with adequate commercial or publicly-owned infrastructure to enable the highest/best reuse, and
- d) actually reused.

“Highest and best” reuse means scenarios that ensure reuse of a covered product in a similar or more environmentally preferential way, as opposed to reuse that leads to environmentally worse outcomes.

Discussion Prompts

- 7.1. Is it appropriate to give reusable products a grace period during which projections rather than actual data may be used for key parameters?
- 7.2. Should “reusable product” be defined in a way that focuses specifically on products for which producers or government provide infrastructure for reuse, as opposed to products that customers reuse?

VIII. Key PCR Aspect #5 – Scenario Analysis

DEQ recommends a requirement that producers of covered products perform sensitivity analysis for key data, parameters, or methodological choices (i.e., the impact hot spots) in the life cycle evaluation of their products. Sensitivity analysis is generally understood in this context as a “systematic procedure for estimating the effects of choices made regarding methods or data on the outcome,” according to ISO 14044:2006 Section 3.31. The purpose of this requirement is to provide additional quantitative information about the potential variability of results associated with the life cycle evaluation of a given covered product. The sensitivity analysis should specifically include the range, min/max, and variance across all required impact categories and indicators.

DEQ proposes to require sensitivity analysis for the following two variables:

- a) Electricity grid mix
- b) Recycling allocation methodology

For the identification of other impact hot spots, DEQ proposes to have analysts follow PEFCR guidance at Sections 7.4.2 and 7.4.3, identification of the most relevant stages and processes.

Discussion Prompts

- 8.1. Should DEQ require sensitivity analysis?
- 8.2. Should sensitivity analysis be used exclusively to communicate variability and to feed back into subsequent revisions of the PCR with respect related to variability across assessments? Or should sensitivity analysis be considered in the ecomodulation bonus for substantial impact reduction?

IX. Key PCR Aspect #6 – Recycling Allocation Procedures

Within conventional LCA, more than a dozen different accounting procedures have been proposed for allocating impacts (including avoided impacts) when materials are recycled (and recycled materials displace virgin production). These different procedures vary in terms of data requirements, complexity, and results, with some industries favoring specific recycling allocation procedures that generally cause their materials to be viewed more favorably. This dynamic, coupled with lack of standardized or uniform approaches, results in some LCA results being not truly comparable, or otherwise biased in favor of one material over another.

The issue of recycling allocation procedures and more specifically, which approach(es) to allow, is very complex and will not be resolved as part of this rulemaking. DEQ's rule concepts would generally not result in comparisons between different materials, except potentially in the case of "significant reduction" ecomodulation bonuses when a producer changes materials.

DEQ proposes through this rulemaking to take some initial steps addressing this topic by requiring disclosure and prohibiting the use of accounting methods that result in double-counting. Specifically, end-of-life allocation shall follow the requirements of ISO 14044, section 4.3.4.3. More specifically when calculating substitution benefits at end of life producers would be required to follow the methods and guidelines found in chapter 7.1.7.6 *Benefits and loads beyond the system boundary in optional supplementary module D* of ISO 21930:2017. This rule concept does not prescribe or favor one recycling allocation methodology (e.g. the "avoided burden" approach versus "cut off" approach); however the producer must disclose the underlying methodology applied and ensure that no double counting of benefits occurs (e.g. one may not reduce upstream impacts through the "cut off" approach while simultaneously taking credits at end of life through "system expansion").

DEQ also proposes to require producers to justify quality factors applied when allocating benefits of recycling, as many recycling processes for plastics materials yield lower-quality materials compared with virgin materials. Such quality losses should be reflected in reduced credits for recycling, and the justification requirement is intended to serve as a check for this.

Discussion Prompts

- 9.1. Should DEQ prescribe specific recycling allocation methodologies within these rules? If so, should there be a single methodology that is prescribed across all covered products? Or should product category or material-specific recycling allocation methodologies be set? Or should these current rules allow producers to choose between different allocation methods?
- 9.2. Does any specificity or distinction need to be made for different types of recycling (e.g. mechanical vs. chemical)? Concerns have been raised regarding freedom of allocation when assessing life cycle impacts of chemical recycling.

X. Key PCR Aspect #7 – Biogenic Carbon Accounting

DEQ proposes a biogenic carbon accounting methodology that is consistent with the approach outlined by ISO 21930:2017. Namely, flows of biogenic carbon (that is carbon derived from biomass) shall be accounted for and reported within the underlying life cycle inventories of covered products. Inputs shall be characterized as a negative inventory flow (-1 kg CO₂e/kg CO₂) and outputs as a positive elementary flow (1 kg CO₂e/kg CO₂) when calculating Global Warming Potentials (GWP).

DEQ does not recommend the inclusion of GWP including biogenic carbon flows in the eco-modulation scheme devised by the PRO, in particular the bonuses granted for "significant reduction" in impacts demonstrated through these standards. This reflects the short-lived nature of covered products that contain biogenic carbon and is also consistent with the impact categories prescribed by the PEFCR methodology, see Rule Concept IV above.

Discussion Prompts

- 10.1. Because of the variability of covered products (some interacting with biogenic carbon flows and others not) under these rules, DEQ discourages the use of GWP results including biogenic carbon from any ecomodulation fees. However, is it sufficient to simply follow the structure of ISO 21930 here? Do we need a more nuanced approach for modeling biogenic carbon?
- 10.2. Should covered products which interact with biogenic carbon fluxes to/from the environment be required, as proposed, to report both GWP excluding and GWP including biogenic carbon?

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