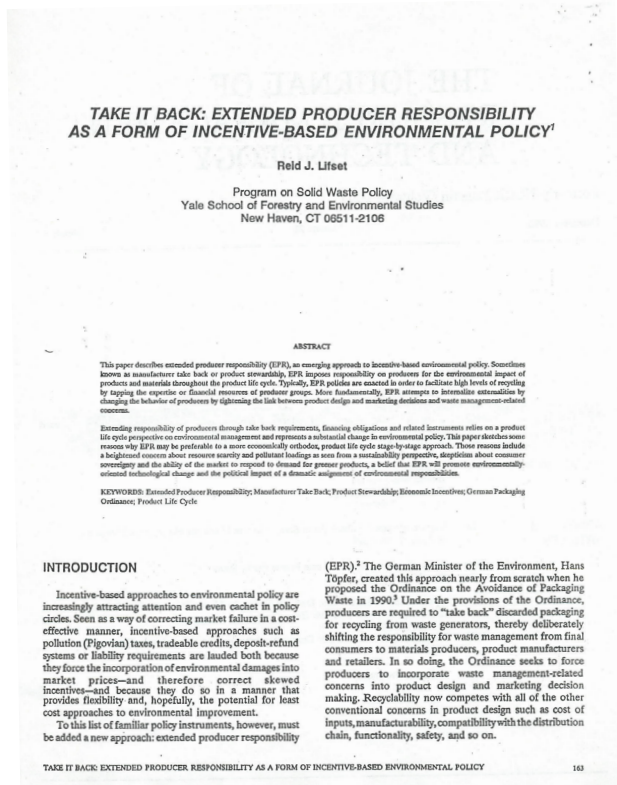


Restoring the incentives for eco-design in EPR: The challenges for eco-modulation

Maryland EPR Advisory Council
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Yale SCHOOL OF THE ENVIRONMENT

EPR Reference Database

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Welcome

This is a database of references to research, debate, and policymaking publications related to Extended Producer Responsibility (EPR), a policy strategy that assigns responsibility to producers for products when they become waste.

Focus

The primary focus of the database is on grey literature (i.e., reports self-published by governments, industry and NGOs). It also contains references to journal articles, books, conference presentations, statutes, court cases, annual reports, web sites and many other sources. It is a bibliography and does not contain the documents themselves. The documents are not part of the database because Yale does not hold the copyright to those publications.

To access the database click on the Database Menu.



The World's Only EPR cartoon?



1. Eco-modulation 101

2. The Challenges of Restoring Eco-Design Incentives

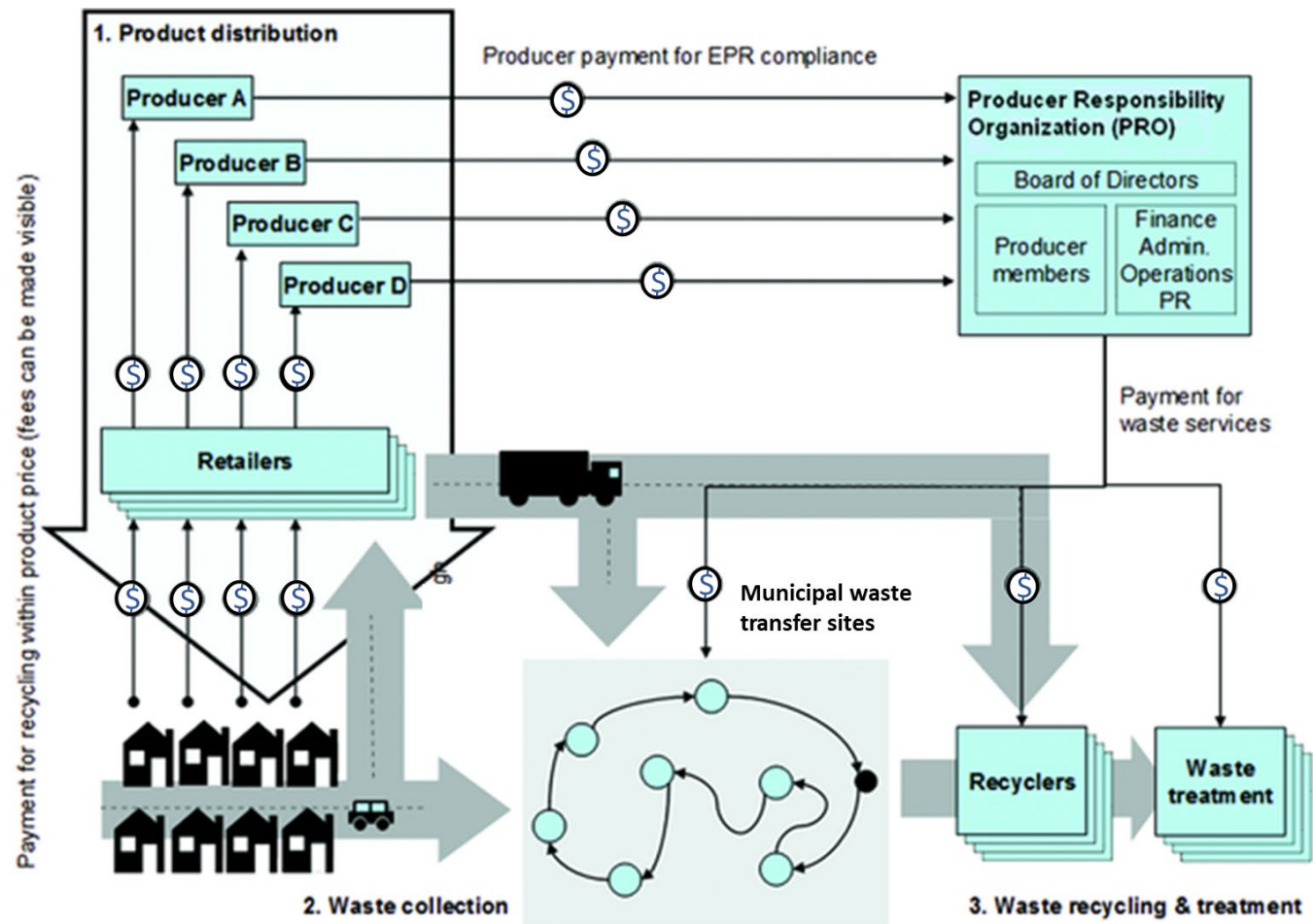
3. Meeting the Challenges

4. Conclusions

Eco-modulation 101

Why Eco-modulation?

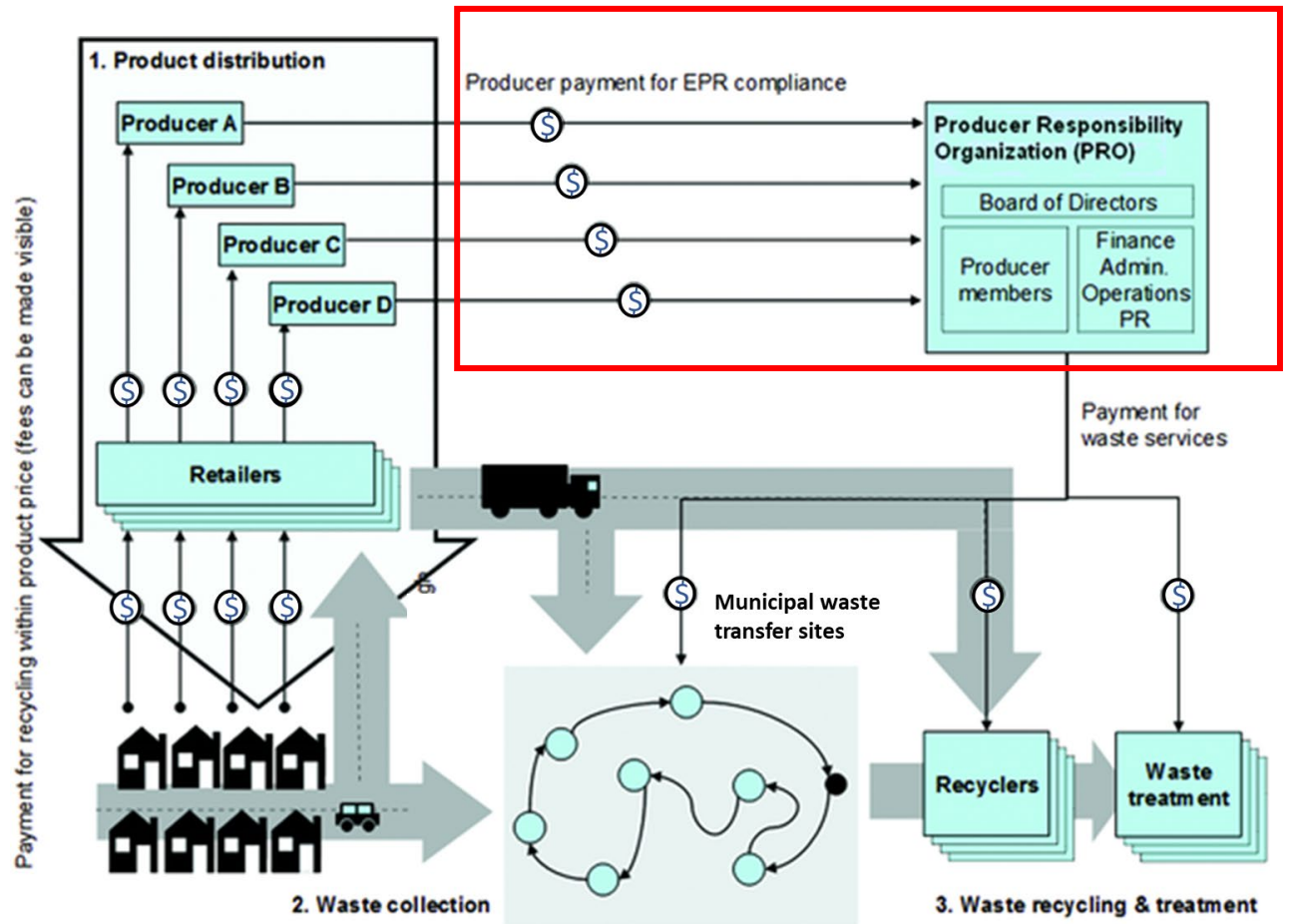
The Problem: Collective EPR



Adapted from Mayers 2013

Why Eco-modulation?

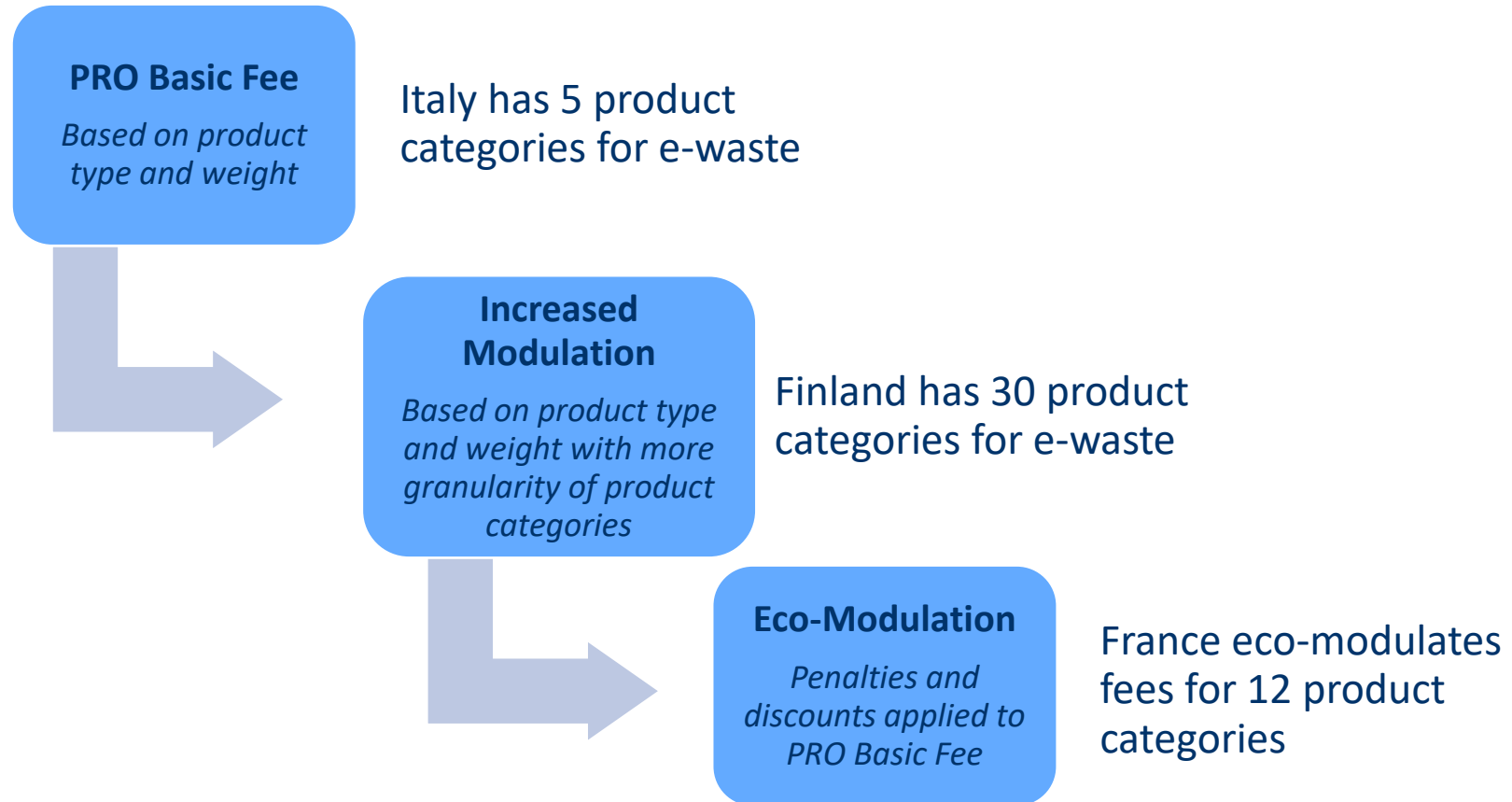
Collective EPR limits
incentives for eco-
design



Adapted from Mayers 2013

**Eco-modulation aims to restore the
eco-design incentives missing in EPR**

The Remedy: Eco-modulation



Eco-modulation for packaging: Discounts and penalties

Characteristic	Discount or Penalty
Recyclability	Penalty: Problematic components
Recycled content	Discount: Recycled content above specified threshold
Transparency	Discount: Use of LCA
Public education	Discount: Education campaigns and information
Hazardous materials	Penalty: Use of additives or presence of residues

Modulation Already Exists

25 EU Member States
and the UK have EPR
schemes for packaging
waste

	'Basic' modulation - i.e. different fees per material type	Greater granularity in fee structure - e.g. specific fees for certain types of packaging e.g. PET/HDPE, beverage cartons etc.	'Advanced' modulation (e.g. penalty fees, or numerous different fee levels within material type
Austria	Y	Y	
Belgium	Y	Y	
Bulgaria	Y	Y	
Croatia	Y	Y	
Cyprus	Y	Y	
Czech Republic	Y	Y	
Estonia	Y		
Denmark	-	-	-
Finland	Y	Y	
France	Y	Y	Y
Germany	Y	Y	
Greece	Y	Y	
Hungary	-	-	-
Ireland	Y	Y	
Italy	Y	Y	Y
Latvia	Y		
Lithuania	Y	Y	
Luxembourg	Y	Y	
Malta	Y		
Netherlands	Y	Y	Y
Poland	Y		
Portugal	Y		Y
Romania	Y	Y	
Slovakia	Y	Y	
Slovenia	Y	Y	
Spain	Y	Y	
Sweden	Y	Y	Y
UK	Y		

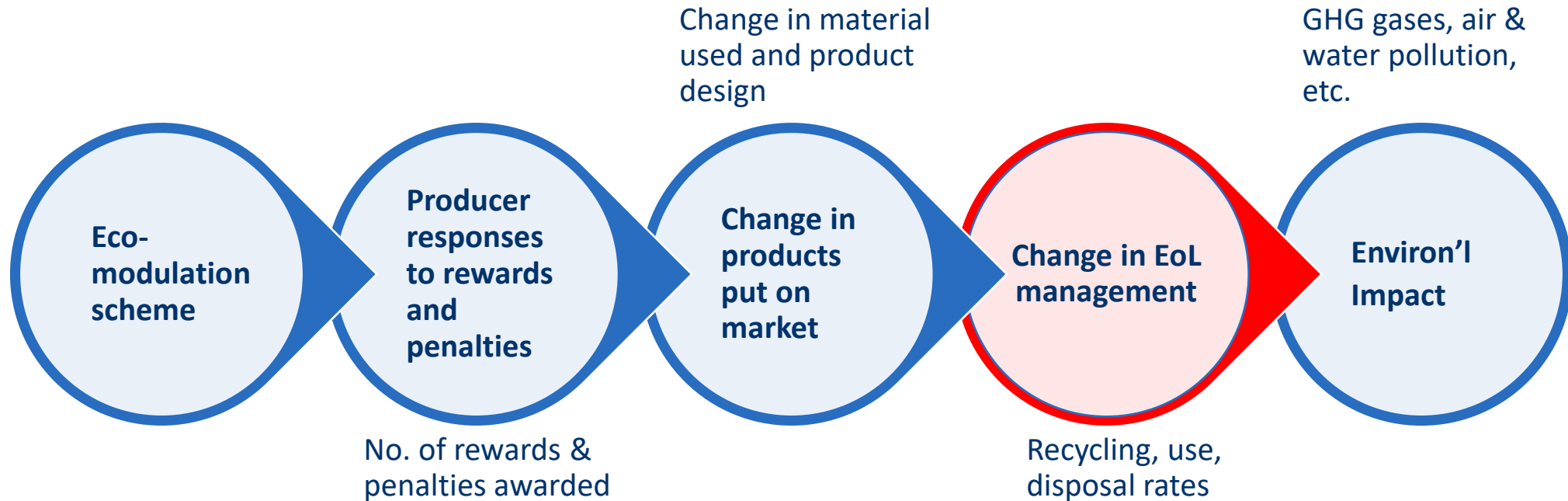
*Eunomia, 2020. Study to Support
Preparation of the Commission's
Guidance for EPR Schemes*

Key Components of Eco-Modulation

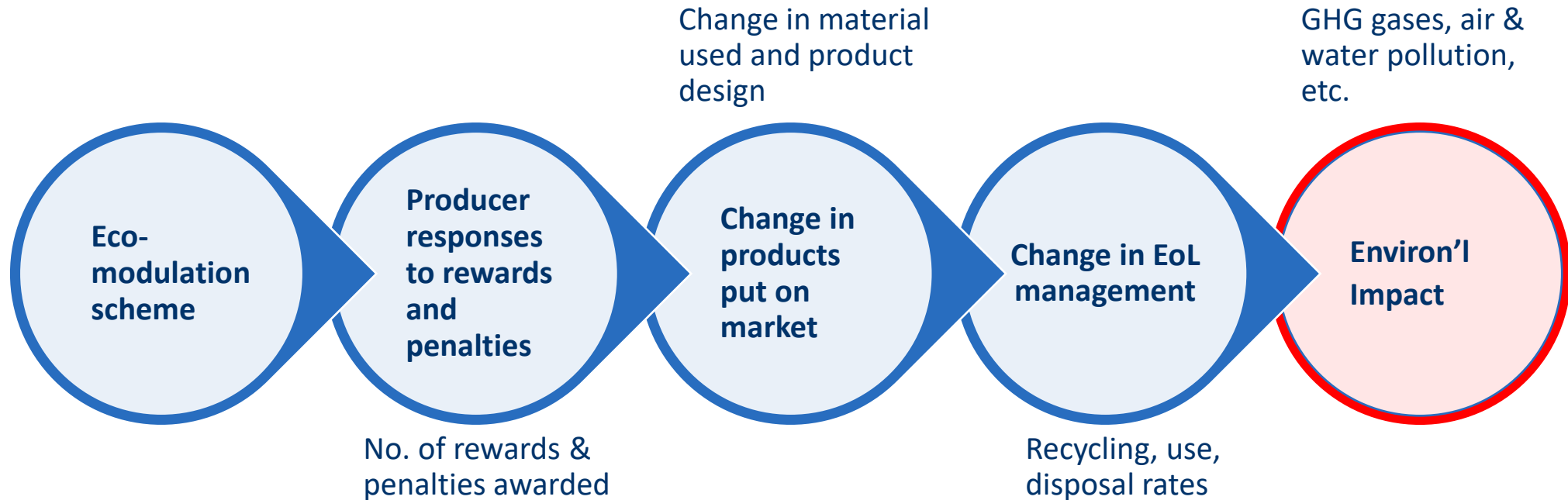
- Product Scope
- Objectives
 - Recyclability
 - Recycling rate
 - Problematic substances
 - Recycled/sustainable content
 - Increase life span (durability, reusability, repairability, refillability)
- Technical Criteria
- Fee Structure
 - Granularity
 - Penalties and discounts
- Fee Magnitude

The Challenges to Eco-modulation

EPR typically focuses on improving recycling rates



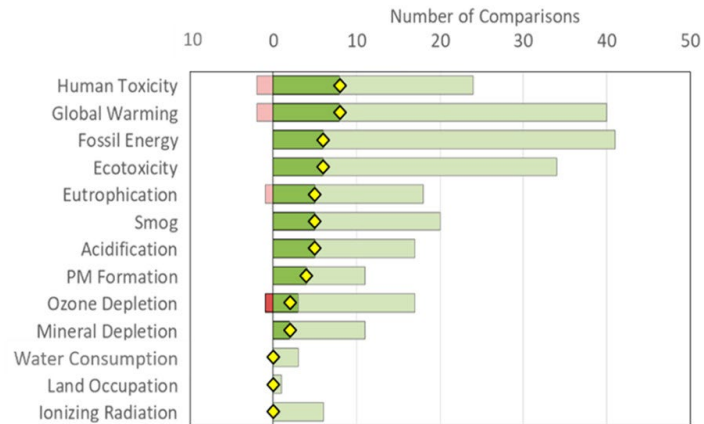
Circularity is only an intermediate goal



Product Attributes are an Unreliable Proxy

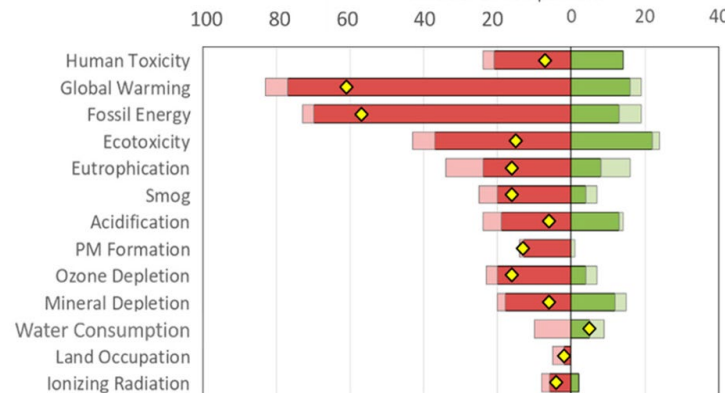
The material attributes of packaging is not a consistent guide to environmental preferability

Vendries, et al. 2020. *The Significance of Environmental Attributes as Indicators of the Life Cycle Environmental Impacts of Packaging and Food Service Ware.* *Env Sci. & Tech.* 54(9), 5356–5364.



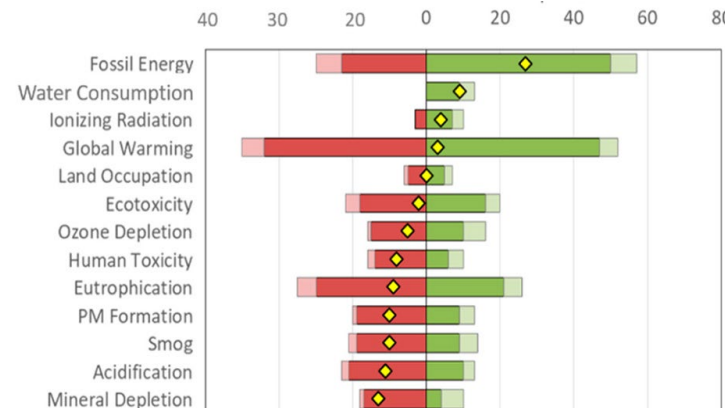
Recycled Content, same material

Mostly performs better across impact categories



Recycled Content, different material

Mostly performs worse compared to material without recycled content



Recyclable, different material

Mixed results for recyclable material compared to non recyclable material

■ ≤0.75 ■ >0.75 & <1.0 ■ >1.0 & <1.25 ■ ≥1.25 ◆ Net Result

Eco-modulation can lead to perverse outcomes

Extended product lifespans may prolong use of less energy-efficient appliances



Reusable packaging requires multiple cycles to outperform single-use alternatives



Practical Difficulties in Implementation

Ineffective incentives from eco-modulation

Fees and Prices, France, 2018

Items	Eco-mod fee (€)	Average sales price (€)	Fee/price
Textiles	0.007	18.0	0.04%
Smartphones	0.02-0.04	280.0	0.007%
1.5L water bottles	0.01	0.62	1.6%
Car tires	1.25	70.0	1.8%
Refrigerators	20.0	440.0	4.5%
Washing machines	10.0	370.0	3.2%

Vernier, 2021

Data management, verifiability, and traceability



Insulation of producers from eco-modulation through online sales

Harmonization is Limited and Difficult

Many stakeholders call for harmonization, but...

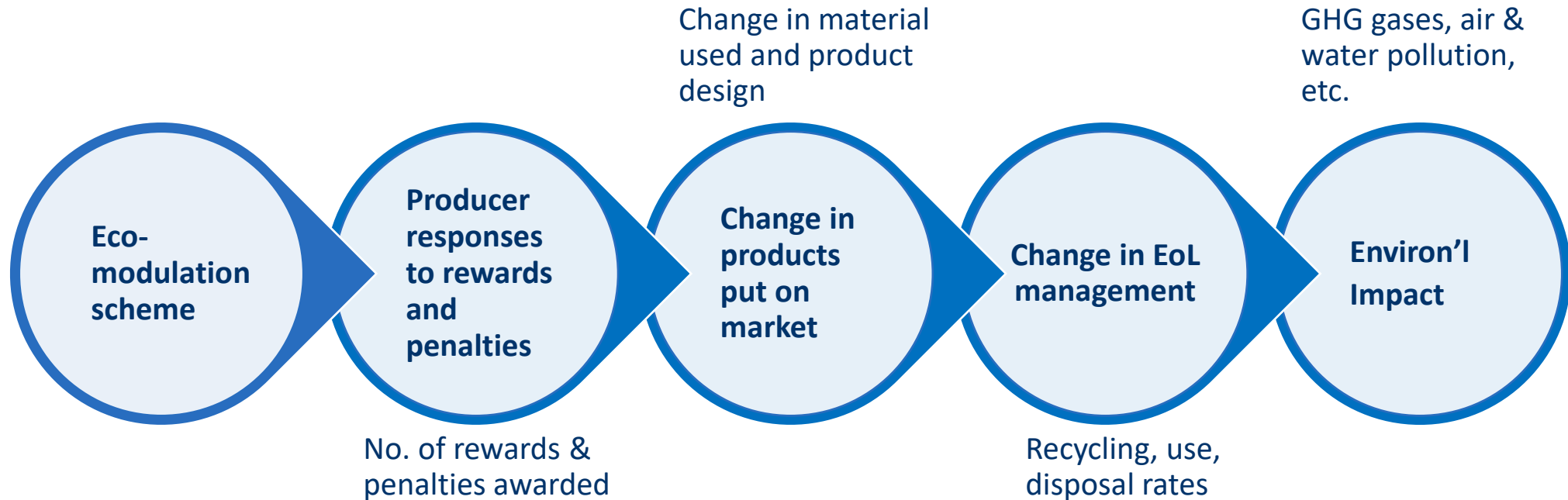
Why so little harmonization?

- Disagreement or differing interests among producers
- Producer resistance to “harmonizing up”
- Limited domestic constituency
- Concerns about stranded assets
- Legal barriers to enforcing consistency
- Government reluctance to cede control to other entities or levels of government
- Path dependency and cost of adjustment
- Underlying differences in product markets and waste systems

Effects of lack of harmonization

- Costs to producers
- Difficulty in evaluating impact
- Increased incentives for free-riding
- **Weak market signal**

Evaluation is complicated



Will we know if eco-modulation works?

EPR has a poor track record for policy evaluation

1. Limited, poor data
2. Methodological obstacles
3. Little history of policy evaluation after implementation

“There is a serious lack of both technical and financial data.”

- OECD, Updated Guidance Manual for Efficient Waste Management

Meeting (some of) the Challenges

Increasing Connection to Environmental Outcomes

Use LCA to inform policy design

- Innumerable statements of European Commission for need for life cycle approach
- Some (very limited) precedents
 - CONAI (Italian packaging PRO)
 - WEEE Forum (association of e-waste PROs)
 - Product environmental footprint (EU method for measuring environmental footprints)
 - Low Carbon Fuel Standard (California)

Oregon Innovates

Largest 25 producers evaluate and disclose life cycle environmental impacts for 1% of covered products every two years

Bonuses that reward evaluation and disclosure of environmental impacts

Addressing Evaluation Challenges

- More data collection, more data harmonization
- Systematic collection of data from PROs
- Life cycle assessments
- Natural experiments
- Detailed case studies
- Occasional deep dives—not possible if data is not available

Take-aways

- Restoring eco-design incentives likely to be more difficult than expected
- Will be difficult to assess success

=> However, impending implementation is propelling considerable activity in industry

- Change the norms in policy discourse and analysis
 - Data availability, verification, transparency critical
 - *Ex post* policy evaluation

For more detail, see



Lifset, R., H. Kalimo, A. Jukka, P. Kautto, M. Miettinen. 2023. Restoring the Incentives for Eco-design in Extended Producer Responsibility: The Challenges for Eco-modulation. *Waste Management*. 168: 189-201.

<https://doi.org/10.1016/j.wasman.2023.05.033>

or see



Interview in *Resource Recycling*

<https://bit.ly/RR-ecomod>

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