FACT SHEET

August 2025

Registering Low Molecular Weight Polymers: Costs, Impacts, and Policy Implications under REACH

Introduction

> A low molecular weight polymer is a polymer whose individual chains (or molecules) have relatively short lengths and are below a certain threshold (1000 Dalton). These are used in many applications, including semi-conductors, photovoltaics, medical applications, 3D-printing, coatings and lubricants.

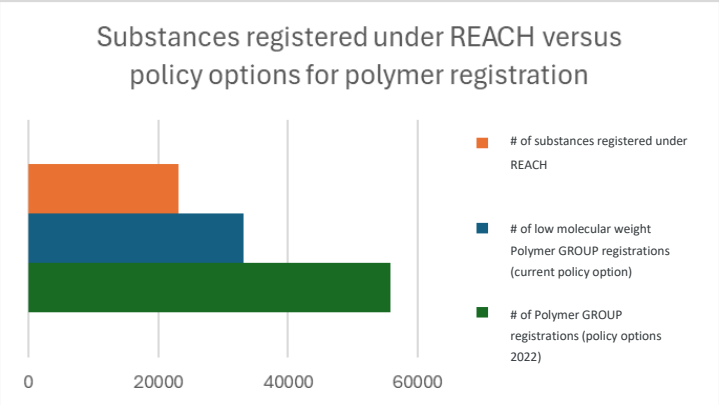
In 2022, environmental consultancy, Ricardo Energy and Environment, performed an Economic Analysis of the impacts of the actions announced in the Chemical Strategy for Sustainability for Cefic. This included an impact analysis of potential polymers registration under REACH.

Polymers were grouped according to their molecular weight and additional hazard criteria[1] identified by the European Commission at the time.

Building on the 2022 assessment, in 2025 Ricardo analysed the potential implications of registering only low molecular weight polymers – this is one of the options currently under consideration for the revision of REACH.

Number of registrations

Introducing the registration of low molecular weight polymers under REACH would require the full registration of **at least 33,000 groups of polymers**. While this policy option would result in fewer **groups of polymer registrations** than the 2022 options, it would still lead to significantly more registrations than those under the current REACH since 2007.



These estimates only cover the upstream sector and do not include low molecular weight polymers developed by the downstream user sectors, like formulators.

[1] Beside (low) molecular weight, other criteria considered included reactive functional groups, cationicity, degradation products etc.

European Chemical Industry Council - Cefic aisbl
Rue Belliard 40 b.15 B-1040 Brussels Belgium
Tel. +32.2.436.93.00 mail@cefic.be www.cefic.org
EU Transparency Register n° 64879142323-90

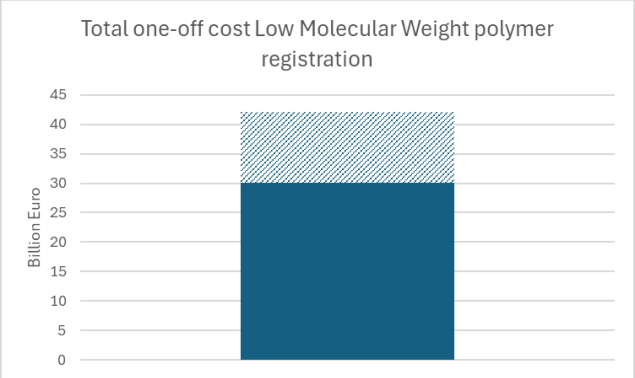
Administrative and testing costs

> It is assumed that the information requirements for low molecular weight polymers would be very similar to those applied today for non-polymeric substances and are tonnage-based.

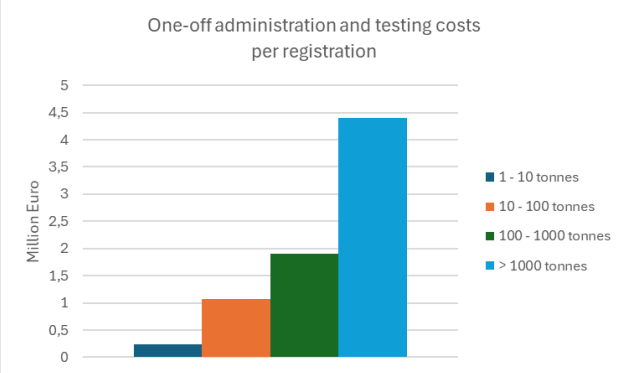
The one-off costs for a low molecular weight polymer registration would **exceed €30 billion**. The majority of the cost (≈ 90%) would be linked to generating data on polymer properties.

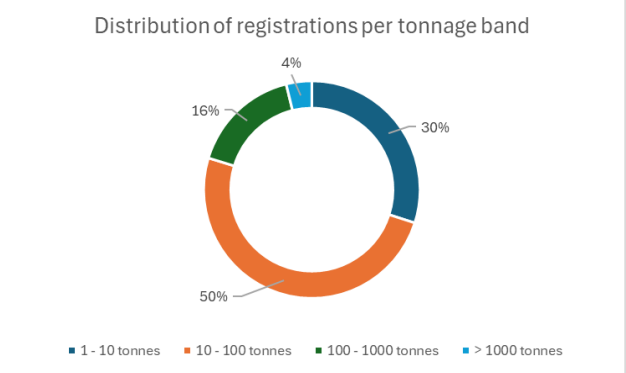
The remaining costs would be administrative, related to preparing, managing and submitting dossiers to the Agency.

In comparison, the EU polymer industry has an annual turnover of €80 billion, with only a portion attributed to the manufacturing of low molecular weight products.



66% of all registrations would be in the range of **€1-2 million per dossier**. The average cost of individual dossiers across all tonnage bands is around €1 million reaching €4.4 million for high tonnage registrations.





Impact on Small and Medium Enterprises

The number of SMEs having registration obligations would increase by 20 – 40% compared to today. Many more will be indirectly impacted as downstream users, through compliance obligations like safety data sheets, use mapping, and communication in the supply chain.

	REACH 'now'	+ polymer registration	%change
SMEs 'affected' by registrations	2,500-5,000	+ 600-1,800	20-40% ↑

More detailed figures are included in the Annex – 'Polymer regulation in Europe, and considerations from international precedent', August 2025 by Ricardo.

Polymer regulation in Europe, and considerations from international precedent

For the European Chemicals Industry Association

August2025

Disclaimer

This document contains findings from a very rapid review of evidence and previous studies conducted by Ricardo for the European Chemical Industry Association (Cefic) in 2022, in response to a call-off request in May 2024. The content on these slides should not be reproduced nor used outside of the context in which they were produced. We accept no responsibility for how these slides/content are interpreted and/or used for any other purpose than what is set out here.

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1.1. Context, aims and scope: exploring polymer registration models

Context

International approaches to polymer regulation differ across the globe.

In 2020, the European Commission published the Chemicals Strategy for Sustainability (CSS), in which it committed to **review polymer registration requirements** and potentially extend these requirements to certain polymers of concern.[1]

In 2022, Ricardo performed an Economic Analysis of the Impacts of the CSS for Cefic (the '2022 Ricardo study'). This included an **impact analysis of potential polymer registration scenarios**.

In 2025, the European Commission **outlined their proposals to revise the REACH Regulation**, including notification of all polymers >1 ton/yr, and the development of criteria for 'polymers requiring registration'.

Aims and scope

This slide pack **explores and compares the implications of the 'CSS EU REACH Standard Information Requirements[1]'** model for 1) all polymers; and 2) low molecular weight (LMW) polymers only. We continue with an assessment of the EU polymers market, for reference, and explore the following:

- **The regulatory complexity** of the policy model
- **Number of polymers** requiring notification and/or registration in the European Union
- **Associated costs**
- **Potential SME implications**

[1] Policy Option 1 in the 2022 Ricardo Study, noting this might not reflect the requirements under current regulatory proposals

1.2. The EU chemicals industry – key metrics

Chemicals industry	>EUR 600 bn/year Source: Eurostat, Cefic
Pre-registration under REACH (unique entries)	>145,000 Source: ECHA (2008, excludes polymers)
Polymer manufacturing	~ EUR 80 bn/year Source: Eurostat/Prodcom
Numbers of polymers	>145,000e Source: 2022 Ricardo study

Caveat: Please note these estimations are based on chemical manufacturing activities only rather than downstream activities that comprise tailor made polymers. These estimates are shared for insights into these markets only.

1.3. Differences in regulatory options for the EU: EU REACH SIR vs LMW SIR

	EU REACH Standard Information Requirements (SIR) model (all polymers)	EU-REACH SIR model (LMW only)
Notification requirements	All polymers	All polymers
Registration exemption	If polymer does not meet the Polymer Requiring Registration (PRR) criteria[1]	If polymer does not meet the Polymer Requiring Registration criteria High molecular weight polymers (>1,000 Da)
Registration requirements	EU SIR by tonnage band	EU SIR by tonnage band

[1]Based on the latest proposal presented by the Commission in the 8th CARACAL Sub-Group on Polymers, May 2025.
Presented for EU REACH SIR model that assumes registration for all polymers, versus registration for LMW polymers only.

2. Potential number of polymers requiring notification and registration

	EU REACH SIR model (all polymers)	EU REACH SIR model (LMW only)
Individual Polymers requiring notification	145,000	145,000
Polymer Groups requiring registration	55,000[1]	33,000[1]

NB: Please note these estimations are based on chemical manufacturing activities only rather than downstream activities that comprise tailor made polymers and are provided for insights into the comparability of these markets only

[1]These are estimated numbers of polymers by **CAS group**.

3. Potential SME implications of polymer registration under either model

	REACH 'now'	+ polymer registration	%change
Substances in scope	150,000e*	+ 145,000e	c100% ↑
Registrations	26,600	+ 33,000-55,000 **(Polymer Groups)**	125-200% ↑
SMEs 'affected' by registrations	2,500-5,000	+ 600-1,800	20-40% ↑

*Estimated total number of chemicals including polymers in EU market of c300,000
NB Multiple sources, including EEA, ECHA and expert judgement to produce high-level (guess)estimates
Caveat: Please note these estimations are based on chemical manufacturing activities only rather than downstream activities that comprise tailor made polymers

4. Potential notification and registration costs

	EU REACH SIR model (all polymers)	EU REACH SIR model (LMW only)
Notification costs (one-off)[1,2]	EUR 0.5-9 billion	EUR 0.1-2 billion
Registration costs (one-off)[2]	EUR 40-50 billion	EUR 30-40 billion
Testing costs as % of reg. costs	90%	

Source: 2022 Ricardo Study for Cefic, based on assumptions associated with testing requirements and costs under an EU REACH LMW model. See Appendix A6.2 for more detail. Future ongoing costs are not considered in this illustration

[1]In EU REACH SIR LMW, notifications are assumed only for LMW polymers.

[2]lease note these estimations are based on chemical manufacturing activities only rather than downstream activities that comprise tailor made polymers

NB Please note that the administrative and testing costs are updated based on stakeholder engagement and differ from the 2020 Wood Study (Scientific and technical support for the development of criteria to identify and group polymers for registration/evaluation under REACH and their impact assessment, https://op.europa.eu/en/publication-detail/-/publication/1cc811ff-d5fc-11ea-adf7-01aa75ed71a1/language-en). See Appendix A6 for more on this

5. Conclusions

Tens of thousands of polymers could be in scope of registration under both policy options

Based on the available evidence, it has been estimated that an EU REACH SIR Policy Option could require the registration of around **55,000 polymer groups** (by CAS group) in the EU, which could be lower but still surpassing **33,000 polymers groups** (by CAS group) under an EU REACH SIR model for LMW. That is, the LMW model does not necessarily result in a significantly lower scope for polymer registration.

There could be a large addition of SMEs under scope of REACH registration

600-1,800 SMEs manufacturing polymers in the EU could be 'affected' by polymer registration under REACH due to the polymer registration policy options, which could mean a 20-40% increase in SMEs participating in REACH registration activities, based on a high-level estimation and limited available evidence.

Administrative and testing costs could surpass EUR 20 billion under both models

The available evidence suggests that any of these options will require billions in administrative and testing expenditures to comply, which could have negative implications on the EU industry's competitive position, and especially burdensome for SMEs.

Appendix

Appendices

A1. Acronyms

A2. International Polymer Regulatory Approaches

A3. The 2022 Ricardo for Cefic

A4. Analysis of registration and notification costs, and differences between current estimates and the 2022 Ricardo study

A1. Acronyms

Acronym	Definition
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
PRR	Polymer(s) requiring registration
PLC	Polymer of low concern
CSS	Chemical strategy for sustainability
SME	Small and medium sized enterprises
EU	European Union
PO	Policy option
ECETOC	European Centre for Ecotoxicology and Toxicology of Chemicals
Da	Dalton
SIR	Standard information requirement
CAS	Chemical Abstracts Service number
MW	Molecular weight

A2. International Polymer Regulatory Approaches

Overview

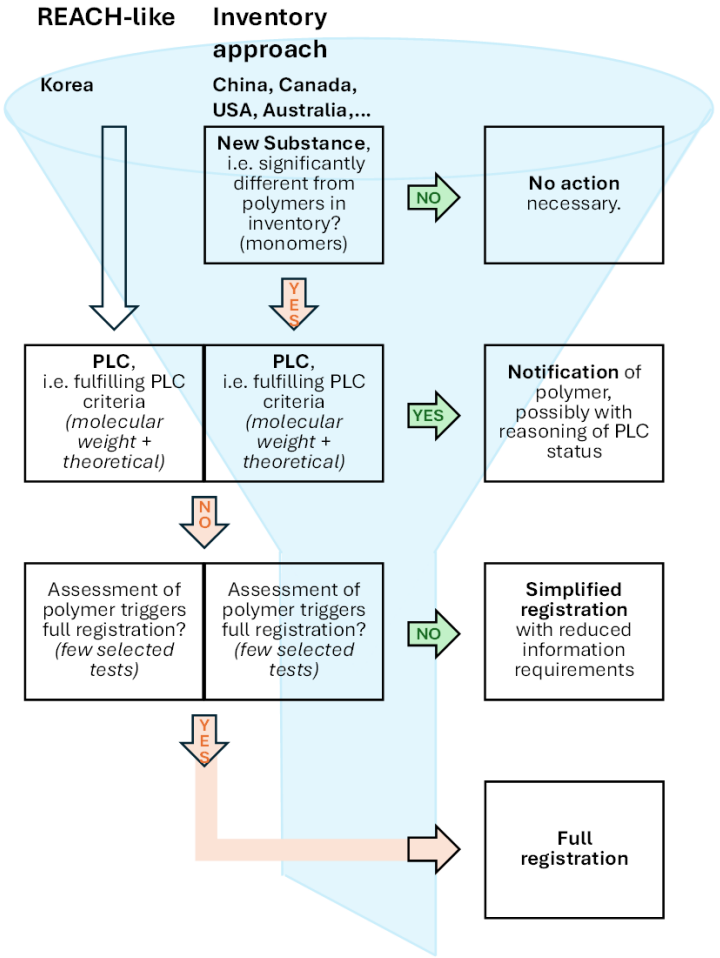
Outside of Europe, there are different approaches to polymer registration.

Several countries (USA, Canada, China, Australia) use an inventory-style approach, where only new substances that are **significantly different** from existing polymers may need to be registered.

Polymer of low concern criteria are developed and substances meeting these criteria are typically exempt from registration requirements.

Korea adopts a more REACH-like model. All polymers must be notified. K-REACH operates on an exemption model: if polymers do not meet the PLC criteria for exemption, they must be registered.

K-REACH has both simplified and comprehensive registration requirements, depending on the structure and properties of the polymer.



Summary of different global regulatory processes for polymers. Source: Cefic

A3.1 The 2022 Ricardo Study for Cefic

Summary

This 2022 study was commissioned by the European Chemical Industry Council to **assess the business impacts to the European (EU) chemicals industry** of selected actions from the European Commission's (EC) Chemicals Strategy for Sustainability.

The study assessed the potential impacts to the EU-27 polymer industry as a result of the introduction of REACH registration requirements for polymers. Two Policy Options (PO) were explored:

- **PO1: Adaptation of the current standard information requirements** (SIR) for REACH registration
- **PO2: ECETOC** (European Centre for Ecotoxicology and Toxicology of Chemicals) **grouping and testing strategy for polymers**.

Under PO1, the grouping strategy for a **polymer requiring registration (PRR)** was based on the same CAS number or, in absence of CAS, based on the same reactants and within a 2% molecular weight.

Policy Option Implementation Criteria

Specific criteria for Polymers Requiring Registration (PRR) were developed to identify polymers that require registration. Polymers were grouped according to their molecular weight (MW) and require registration if:

- PRR type 1: **<1,000 Da**;
- PRR type 2: **1,000-10,000 Da** if >5% oligomer content below 1,000 Da and >2% below 500 Da;
- PRR type 3: **>10,000 Da** if >25% oligomer content below 1,000 Da and >10% oligomer content below 500 Da; **or**

If specific hazard criteria are met;

The polymer is cationic;

Contains reactive functional groups

Surface active <45 mN/m

Degrades to substances of concern

A3.2 The 2022 Ricardo Study for Cefic

The study was underpinning by primary data collection and analysis targeting polymer manufacturers and enabled the estimation of the potential number of polymers that could meet the PLC criteria, and/or PRR by group. The estimates are included below.

Indicator	Total	Polymer PRR Groups type (see previous slide A3.1)		
Total polymeric substances placed on the market in the EU-27	145,697			
Total polymers meeting PLC criteria	62,734			
Total polymeric precursors	1,211			
Totals (by CAS groups) per PRR type		**Type 1 (LMW)**	**Type 2**	**Type 3**
CAS 1-10 tonnes	16,811	9,916	5,928	967
CAS 10-100 tonnes	22,499	16,461	5,281	757
CAS 100-1000 tonnes	11,106	5,449	4,235	1,422
CAS >1000 tonnes	5,380	1,268	2,491	1,621
Total (by CAS group)	**55,796**	**33,094**	**17,935**	**4,767**

A4.1. Analysis of ‘registration costs’, differences due to testing cost assumptions

	Number of polymer groups by CAS group	Testing costs, 2020 Study (weighted by tonnage)[1]	Testing costs, 2022 Study (weighted by tonnage)[2]
Low Molecular Weight (T1 **PRR groups**)	33,094	× 173,600 €/pol = € 5.7 bn	×1,090,000 €/pol = € 36.0 bn
Type 2 PRR groups	17,935	× 111,600 €/pol = € 2.0 bn	× 450,000 €/pol = € 8.1 bn
Type 3 PRR groups	4,797	× 149,600 €/pol = € 0.7 bn	×590,000 €/pol = € 2.8 bn
Total PRR groups	55,796	× 151,600 €/pol = **€ 8.5 bn**	×841,600 €/pol = **€ 46.9 bn**

Please note differences might exist due to rounding

[1]Based on evidence of costs of testing per registration by type, estimated in Wood & PFA-Brussels (2020)

[2]Based on evidence of testing costs by PRR ‘group’ by type, estimated in Ricardo (2022)

A4.1.1. Analysis of ‘registration costs’ for tonnage bands – number of **polymer groups**

	Total number of polymer groups	Low Molecular weight groups	Type 2	Type 3
1 – 10 tonnes	**16,811**	9,916	5,928	967
10 – 100 tonnes	**22,499**	16,461	5,281	757
100 – 1000 tonnes	**11,106**	5,449	4,235	1,422
>1,000 tonnes	**5,380**	1,266	2,491	1,621
Total	**55,796**	**33,094**	**17,935**	**4,767**

A4.1.2 Analysis of ‘registration costs’ by tonnage band – 2020 study (Wood)

	Testing costs, (weighted by tonnage)[1] Low Molecular Weight	Testing costs, (weighted by tonnage)[1] PRR type 2 and 3
1 – 10 tonnes	x 37,000 €/pol = € 0.4 bn	× 37,000 €/pol = € 0.4 bn
10 – 100 tonnes	x 171,163 €/pol = € 2.8 bn	x 91,000 €/pol = € 0.6 bn
100 – 1000 tonnes	x 304,000 €/pol = € 1.7 bn	× 175,000 €/pol = € 0.9 bn
>1,000 tonnes	x 703,000 €/pol = € 0.8 bn	× 220,000 €/pol = € 0.9 bn
Total	**€ 5.7 bn**	**€ 2.8 bn**

= € 8.5 bn

[1]Based on evidence of costs of testing per registration by type, estimated in Wood & PFA-Brussels (2020)

A4.1.3 Analysis of ‘registration costs’ by tonnage band – 2022 study (Ricardo)

	Testing costs, (weighted by tonnage)[1] Low Molecular Weight	Testing costs, (weighted by tonnage)[1] PRR type 2	Testing costs, (weighted by tonnage)[1] PRR type 2
1 – 10 tonnes	x240,000 €/pol = € 2.3 bn	x150,000 €/pol = € 0.9 bn	x150,000 €/pol = € 0.1 bn
10 – 100 tonnes	x1.07 m €/pol = € 17.7 bn	x370,000 €/pol = € 2.0 bn	x360,000 €/pol = 0.3 bn
100 – 1000 tonnes	x1.91 m €/pol = € 10.4 bn	x710,000 €/pol = € 3.0 bn	x690,000 €/pol = € 1.0 bn
>1,000 tonnes	x4.4 m €/pol = € 5.6 bn	x890,000 €/pol = €2.2 bn	x870,000 €/pol = € 1.4 bn
Total	**€ 36.0 bn**	**€ 8.1 bn**	**€ 2.8 bn**

= € 46.9 bn

NB Calculated using by distributing total costs by tonnage band from the 2022 Study (Ricardo), based on the relationship between testing costs across tonnage bands from the 2020 Study (Wood).

A4.2. Analysis of ‘notification costs’ of 145,000 polymers

Approach to costing notifications

A 2020 Study for the Commission (accessible via an FOI request) suggests that costs of notification could be around 4,000 EUR per polymer (by CAS group). However, this assumes no additional information requirements, which remains uncertain.

We mapped additional information requirements when compared to the baseline using the publicly available Annexes to the Commission Staff Working Document ‘Amending Regulation (EC) No 1907/2007’. We concluded there might be information that companies currently lack and will need to generate to conduct a notification.

The % of firms lacking information and thus needing to generate additional information remains uncertain. Thus, a scenario-based approach was conducted to understand potential scale of costs.

The requirements identified, such as different types of tests, were mapped against estimated costs of generating information that companies shared with Ricardo as part of the 2022 Ricardo study. These could reach € 60,000 per polymer.

The requirements to identify degradation products were confirmed as potentially the costliest, surpassing €40,000 per polymer and company. Costs are presented including and costs excluding degradation tests for consideration.

% polymers for which firms already meet info requirements	Notification costs by scenario v1 (including degradation tests)		Notification costs by scenario v2 (excluding degradation tests)	
Proportion of polymers (%)	**Unit cost (EUR/pol.)**	**Total one-off cost (EUR bn)**	**Unit cost (EUR/pol.)**	**Total one-off cost (EUR bn)**
S1: 100%	4,000	0.58	4,000	0.58
S2: 75%	18,000	2.61	8,000	1.16
S3: 50%	32,000	4.64	12,000	1.74
S4: 25%	46,000	6.67	16,000	2.32
S5: 0%	60,000	8.70	20,000	2.90

The scenario analysis produces lower/upper bounds for one-off notification costs in the EU:

- **Around € 0.58 billion if companies have all information needed already available.**
- **Around € 8.70 billion if companies have none of the information needed already available.**

Our view is that one-off polymer notification costs in the EU would likely be between these two estimates.

A4.3. Analysis of ‘registration costs’: current estimates vs 2022 Ricardo study

1- This pack presents polymer registration costs of €30-50 billion under a REACH SIR option.

Based on the available evidence, it has been estimated that an EU REACH SIR Policy Option could require the registration of around **55,000 polymer groups (by CAS group)** in the EU, compared to **33,000 polymer groups** under an EU REACH SIR model for LMW only. That is, the LMW model does not necessarily result in a significantly lower scope for polymer registration.

2- The 2022 Ricardo Study did not present a comparable estimate of administrative and/or testing costs.

The 2022 study presented a range of assumptions which are used in this pack, as well as the assessment of the impact on the ‘additional regulatory burden’, measured as changes in operating expenditure when compared to the baseline or counterfactual. This metric ‘additional regulatory burden’ not only captures the additional testing and other administrative costs, but it also accounts for other impacts, such as effects on the operating size of businesses due to portfolio adjustments and/or net product withdrawals.

3- The estimates of testing costs remain uncertain, depending on a) number of unique or CAS-grouped polymers, b) the information already available to businesses; c) the costs of additional testing.

This pack present assumptions transparently, each of which can be discussed and reviewed to understand the implications of the adoption of polymer registration from different perspectives.

A6.4. Differences with estimates of ‘regulatory burden’ in the 2022 Ricardo Study

The 2022 Ricardo Study did not present an estimate of administrative and/or testing costs, but presented instead the net or additional ‘regulatory burden’ when compared to the baseline. These slides take on a static EU Standard Cost Modelling approach, for comparison with similar assessments.

What is ‘net regulatory burden’	The additional or net regulatory burden compares the burden of regulation in the baseline and the policy scenarios. This accounts not only the administrative and testing costs associated with each polymer (by CAS Group) in the baseline, but also how companies/ market might respond based on primary evidence and scenario analysis, such as substitution and withdrawal effects.
Substitution effects	The consultation evidence suggested that companies might pursue the substitution of ‘affected’ polymers, including but not only by drawing on similar polymeric or other substances for which companies already meet the information requirements and/or there are no regulatory requirements, which reduces the ‘net regulatory burden’.
Withdrawal effects	The consultation evidence also suggested that companies might withdraw polymers from the market, albeit to a more limited extent. This could affect the EU polymer markets, leading to a smaller operating size and overall expenditures, which puts downward pressure on ‘net regulatory burden’ overall (even if ‘unit’ regulatory costs continue to increase).