Towards benchmarks for the proportionality assessment of PBT/vPvB restrictions and authorizations

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Background

- PBTs and vPvBs (for short: PBTs)
- Cost-benefit analysis usually not feasible
- Cost-effectiveness can be used instead, but needs benchmarks
- Proportionality: a ‘reasonable’ level of cost per kg PBT reduction

Objective and approach

- To estimate society's 'willingness to pay' for PBT risk reduction
  - using evidence on past expenditures to see if they can provide building blocks for proportionality benchmarking
- Collection and analysis of cost and effectiveness data
  - initial focus on 7 (groups of) substances
- Assessing the relevance of this evidence for benchmark development
- Formulating suggestions for further work

Scope and information sources (1)

8 (groups of) PBT substances:

D4/D5	Restrictions proposed in EU (wash-off personal care products)
DecaBDE	Flame retardant; restrictions proposed in EU (already banned in EEE)
HBCDD	Flame retardant; to be phased out under Stockholm Convention
HCB	Production, trade and use banned; still legacies / contamination
HCH	Production, trade and use banned; still legacies / contamination
PCBs	Production, trade and use banned; still legacies / contamination
PFOA	Restrictions proposed in EU
PFOS	Banned with some exemptions; still legacies / contamination

Scope and information sources (2)

- 36 studies, mainly EU-based and mainly post-2000
  - Academic literature
  - Consultancy reports
  - Policy documents (incl. restriction and authorisation dossiers)

Results and analysis (1)

Summary statistics (cost estimates in €/kg)

Substance	Min	Median	Mean	Max	N
D4/5	-4	28	76	399	9
HCH/HCB	1	5	117	760	10
HBCDD	-194	25	1290	10,114	14
PFOA	28	1508	1581	3,281	4
deca-BDE	1	327	29,688	251,281	14
PCBs	1	3,675	46,354	413,200	10
PFOS	6	7,703	1,213,837	21,412,950	23

Results and analysis (2)

Different cost types along the chain / life cycle

	Development / design	Service life / use	Waste	Environment
Process / measure to control or remove the PBT	Substitution (substance or product); process change	Emission reduction Clean up / decontamination	Safe disposal	Remediation from environmental compartment
Example 1 (HBCDD)	*Producing new EPS with an alternative FR or replacement of EPS by an alternative insulation material*	*Removing installed EPS insulation panels that contain HBCDD from buildings*	*Incineration of materials with HBCDD*	*Sanitation of construction waste dumps*
Example 2 (PCBs)	*Using alternatives to PCBs in new transformers / capacitors*	*Removing PCBs from existing stock of transformers / capacitors*	*Incineration of PCB waste and soil/sludge with PCBs*	*Removing PCBs from contaminated sites*
Example 3 (PFOS)	*Introducing a PFOS-free process in electroplating*	*Replacing PFOS in fire fighting installations; minimizing emissions in applications that are still allowed*	*Thermal treatment or controlled landfilling of PFOS waste and soil/sludge with PFOS*	*Removing PFOS from soil, groundwater and surface water (e.g. polluted by fire fighting foam)*
Associated direct costs	Additional development and production cost Cost of quality / performance loss	Clean up and replacement cost Cost of emission control	Cost of collection and separation Cost of the various waste treatment routes	Remediation cost
Possible indirect costs	Loss of competitiveness (turnover, employment) due to cost increases	Unavailability of equipment or infrastructure during decontamination operations	Foregone recycling opportunities	Unavailability of land or water until remediation is completed
Cost effectiveness	Costs can be expressed per kg avoided/reduced use or per kg avoided/reduced emission			

Results and analysis (3)

- Cost per kg emission reduction often higher than per kg use reduction
- Example: substitution of PFOS in photo imaging
  - emission reduction: EUR 22 mln per kg
  - use reduction: EUR 2200 per kg
- Cost of substitution often lower than other costs
  - but substitution may be imperfect => 'hidden' costs

Results and analysis (4)

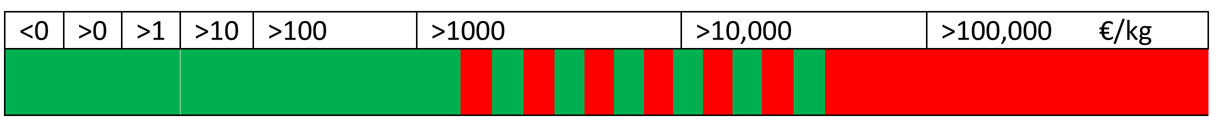
- What is included / excluded in cost estimates:
  - ***Substitution:***
    - > drop-in
    - > additional investments
    - > substitute not necessarily equivalent
      - – quality / performance
      - – environment / health
    - > sunk costs / capital destruction
  - ***Remediation / clean-up:***
    - > separating / isolating / removing the PBT
    - > final treatment / disposal
    - > foregone recycling
    - > indirect costs and wider economic impacts

Results and analysis (5)

- Substance and situation specific features
  - Concentration / dispersion
  - Groundwater vs soil pollution
  - ‘Closed’ and ‘open’ applications
  - ‘Point’ and ‘non-point’ sources
  - Specific geographic conditions

Role of cost estimates in decision making

- Explicit statements on ‘disproportionately high’ costs are scarce
- Indications can sometimes be derived from actual decisions
- Preliminary, tentative conclusion:
  - Below ± EUR 1000 per kg costs seem to be generally acceptable
  - Above ± EUR 50,000 per kg costs tend to become prohibitive (clean-up decisions postponed; exemptions granted)
  - Broad ‘mixed zone’ in which other considerations determine the outcome



Conclusions

- Evidence gathered = small step towards possible benchmarking
- Important to distinguish between different types of decision making situations and different types of costs
- Only comparable cost effectiveness figures should be compared:
  - similar cost types included in and excluded from the estimates
  - similar results (e.g. amount of PBTs emitted to or removed from the environment)
- Differences between PBTs (disregarded here) may be relevant

Suggestions for further work

- Expand the evidence base (add to the current database)
- Focus on the role of cost effectiveness considerations in decision making
- Develop a set of benchmarks taking into account the relevant type of measure and cost types

Thank you!

You can find the final report at:

https://echa.europa.eu/documents/10162/13647/R15_11_pbt_benchmark_report_en.pdf

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