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Industry-Risk Management Options Analysis

Explanatory documents

This is the third in a series of explanatory sheets:

1. RMOA: Definitions and Concepts
2. Preparatory steps for an I-RMOa: strategy and practical preparations
3. Performing the I-RMOA: from Simple to Integrated-RMOa and the three pillars of the analysis
4. Templates for I-RMOa

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Templates for I-RMOa

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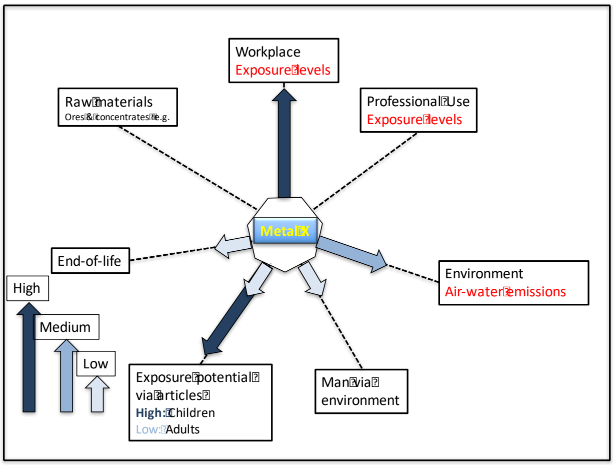
TEMPLATES FOR THE PILLAR 1 - CHEMICALS MANAGEMENT I-RMOA

This is an example of templates one can use. Tables can be used as such or copied and pasted in Excel but the Excel workbook can be obtained from Eurometaux.

Identification of the potential issues to be addressed



- What endpoints should be considered?
- Have all uses been identified and described?
- Where is the exposure occurring?

Discussion:

- **UNCERTAINTIES:**

What are the uncertainties in this assessment?

- Share between intermediate and non-intermediate uses?
- Number of workers that are exposed.
- Uses that have not been accounted for.
- Trends in some uses?

- **How would you assess this identification of risks?**

Relevance? Is the assessment of the risk i.e. respiratory sensitizer as the main/only focus point to consider, in the life-cycle stages/uses described, a good reflection of the reality of risks for a policymaker to suggest a conclusion?

Credibility? How likely will this assessment be accepted by regulators / other stakeholders as being honest and unambiguous?

Acceptability? To what extent will this risk identification be accepted and supported in the companies and the value chain?

Easy to validate? Is this assessment of risks easy to check and validate by external experts/regulators?

Robustness? Are these conclusions able to stand the test of times? Could they be put into question by the resolution of existing uncertainties or ongoing research?

Basically, consider the elements in the Check-list discussed in Annex II:

- **The substance**
- **Uses, volumes and potential exposures throughout the life cycle (substance, constituent of another substance, impurity)**
- **Alternatives per (identified) use** (at a level relevant at this stage of the analysis)
- **Parameters for later Socio-Economic Assessment, per Use**

Identification of all the potential Risk Management Options that may be considered

Step 1: Identification / listing of potential RMOs		
RMO	**What are the conditions that are required to make an RMO feasible and ensure it can be implemented**	
Substitution (Industry initiative)		

Discussion:

Step 2: Feasibility requirements of potential RMOs		
RMO	**Relevancy**	**Description/ scope / justification / comment**
Substitution (Industry initiative)		

NOTE: Among the prerequisites for an RMO to be feasible, it may be important to consider elements such as **data**, **resources**, **time to implementation**, **type of stakeholder involvement** (public-private 'partnership' for a BAT e.g.) on top of regulatory requirements (cf. EU-wide risk for a restriction or scoring for Authorisation after selection as SVHC).

Another political prerequisite is likely to be that the RMOs are proposed with clear and monitorable objectives, hence the importance of providing a scope of the RMO, i.e. an idea of how it key objectives might be worded.

Discussion:

Synthesis:

Possible approaches	Potential RMOs
Simple approach Classical approach, mostly related to the implementation of a regulatory option. No technology-driven integration of management options or use-specific options will be considered	
Combined approach The optimum may consist in a mix of RMOs. This may be a set of complementary regulatory approaches based on use-specific characteristics (cf. restrictions, or OEL (generic for occupational health) combined with specific restrictions (consumer protection e.g.)	

Less likely to fit within a regulatory risk management options assessment is the ‘**integrated approach’**

Possible approaches	Potential RMOs
Integrated approach It may consist in different approaches: • A non-regulatory approach that will consider a technology response or a mix of technology and regulatory measures • An approach involving other substances with the same hazard profile used in the same process (plating e.g.). The solution may then consist in a measure (such as abating plating mist e.g.) that will reduce the risks for the whole set of substances used in the process. This would typically be a type of solution companies can implement rather than a regulator could impose, unless the framework is created for such a joint growing together/evolution (structured dialogue, pilot programmes etc.). In some cases, it may only become possible with the active support or encouragement of regulators if the integrated approach is across the supply chain or crosses supply chain borders.	

Analysis of the potential Risk Management Options

The following templates assume, for the sake of completeness, that different approaches may be considered.

1. EFFECTIVENESS:

Is the RMO able to reduce possible risks and will its effects be measurable?

What is the availability of proven and affordable technology? What is known about alternatives?

The elements developed in previous steps should be synthesised into a couple of sentences per RMO considered for the final comparison.

In function of the options chosen and of the approaches tested, a table will be built to discuss the possible effectiveness of the different RMOs.

RMO	Ability to reduce risk	weight	Measurability / Monitorability	weight	Proven technology available	weight	Overall effectiveness	Ranking
Simple approach (1 measure)								
Combined (more than 1 measure)								
Integrated (holistic vision on processes, value chains etc.)								

Scoring choice: One may rank the option from 0 to 10 (from totally unable to fulfil the criterion to 10 i.e. able to completely fulfil the criterion)

The **weights** suggested are debatable: 0,5 (low importance); 1 (neutral); 1,5 (high importance of the criterion)

Discussion:

2. PRACTICABILITY:

Can the RMO be implemented easily?

RMO	Ease of implementation by Industry	weight	Ease of implementation by Regulators	weight	Time to result	weight	Overall effectiveness	Ranking
Simple approach (1 measure)								
Combined (more than 1 measure)								
Integrated (holistic vision on processes, value chains etc.)								

Scoring choice: One may rank the option from 0 to 10 (from totally unable to fulfil the criterion to 10 i.e. able to completely fulfil the criterion)

The **weights** suggested are debatable: 0,5 (low importance); 1 (neutral); 1,5 (high importance of the criterion)

Discussion:

3. CONSISTENCY:

Is the RMO consistent with a fairly level playing field across the EU? Is there a risk of significant differences between national implementation? Are there any potential overlaps with existing regulations?

RMO	Regulatory consistency across the EU	weight	Consistency with existing EU regulations and policies	weight	Consistency with previous EU initiatives	weight	Consistency with other EU policy objectives	weight	Overall REGULATORY CONSISTENCY	Ranking
Simple approach (1 measure)										
Combined (more than 1 measure)										
Integrated (holistic vision on processes, value chains etc.)										

Scoring choice: One may rank the option from 0 to 10 (from totally unable to fulfil the criterion to 10 i.e. able to completely fulfil the criterion)

The **weights** suggested are debatable: 0,5 (low importance); 1 (neutral); 1,5 (high importance of the criterion)

Discussion:

4. OTHER IMPACTS: ECONOMIC AND HUMAN HEALTH /ENVIRONMENTAL

The impact categories taken up here will depend on the nature of the substance and its use in value chains.

a. ECONOMIC IMPACTS

The criteria should be chosen in agreement with the participants. Depending on the substance and the value chain characteristics, it may be that downstream user-specific impacts are considered.

RMO	Value chain impacts								Company-specific impacts				Overall REGULATORY CONSISTENCY	Ranking
	Supply disruptions	weight	SME-specific impacts	weight	Costs	weight	Impact on Investments (production and R&D)	weight	Costs	weight	Business model and continuity	weight		
Simple approach (1 measure)														
Combined (more than 1 measure)														
Integrated (holistic vision on processes, value chains etc.)														

Scoring choice: One may rank the option from 10 to 0 (from 10 no impact to 0 maximum impact)

The **weights** suggested here are debatable: 0,5 (low importance); 1 (neutral); 1,5 (high importance of the criterion)

Discussion:

b. HUMAN HEALTH AND ENVIRONMENT

The criteria will have to be chosen in agreement with the participants, depending on the substance properties and production situation.

RMO	Human health impacts				Environmental impacts				Overall Human Health and Environmental Impact	Ranking
	Improvement of affected population (workers etc.)	weight	Other health impacts	weight	Specific benefits	weight	Other environmental benefits	weight		
Simple approach (1 measure)										
Combined (more than 1 measure)										
Integrated (holistic vision on processes, value chains etc.)										

Scoring choice: Here one again ranks the option from 0 to 10 (from 0 no positive effect to 10 maximum positive impact)

The **weights** suggested here are also debatable: 0,5 (low importance); 1 (neutral); 1,5 (high importance of the criterion)

Discussion:

Synthesis

It may be useful to perform the **sum of scores** as well as the **sum of rankings**.

RMO	Overall effectiveness	Overall practicability	Overall consistency	Overall economic impact	Overall human health and environmental impact	Overall proportionality	Final ranking (based on scoring)
Simple approach (1 measure)							
Combined (more than 1 measure)							
Integrated (holistic vision on processes, value chains etc.)							

RMO	Overall effectiveness	Overall practicability	Overall consistency	Overall economic impact	Overall human health and environmental impact	Overall proportionality	Final ranking (based on rankings)
Simple approach (1 measure)							
Combined (more than 1 measure)							
Integrated (holistic vision on processes, value chains etc.)							

Discussion:

The above-presented tables focus on a single dimensional approach (Pillar I) although the approach may be more holistic with the consideration of broader impacts, including the overall human health and environmental impact.

If the analysis wants to discuss more in depth the Circular economy and Climate dimensions at stake – what we call pillars 2 and 3 – the table may be presented in a more simplified manner, as follows:

Pillar I: Chemicals Management					
	Effectiveness	Efficiency	Consistency	Broader Impacts	**Conclusion Pillar I**
RMO 1					
RMO 2					
RMO 3					
RMO 4					
RMO 5					

TEMPLATES FOR THE PILLARS 2 & 3 AND OVERALL CONCLUSIONS

PILLAR 2 – CIRCULAR ECONOMY DIMENSION

Preparatory analysis

Circular Economy basics:

For an EU primary and/or secondary metal manufacturer or user, the Circular Economy dimension is of the utmost importance as its company objectives match to a large extent those of the Circular Economy package.

Companies indeed aim at optimising their operations in a way that coincides with the Circular economy objectives as shown by the following elements **at production level:**

- ***Optimisation of yields and of energy consumption***
  This has several dimensions such as:
  - Optimisation of **extraction**/manufacturing of metals (base metals, precious metals, minor metals e.g.) and optimisation of **recovery** of metals from new scrap (DU manufacturing waste) and old scrap (EOL, materials becoming available from the 'stock of metals' accumulated as articles in society);
  - Minimisation of **waste** and ensuring, e.g., that final slags can be of such a quality they can have a useful further life (building industry, infrastructure) rather than ending in landfill sites;
  - Minimisation of **unwanted elements** in input materials (impurities) and optimal processing (concentration in by-products or in waste material or managed re-circulation)
- ***Operational optimisation*** may mean
  - Optimisation of **material mixes** (primary & secondary materials) in the metallurgical process loops;
  - Specialisation in the processing of materials (by-products, often UVCBs) that others cannot treat in a resource -efficient manner (too small quantities, too complex process etc.). This is also a way to ensure a better performance in circular economy terms.

The circular economy dimensions along the supply chain may include the following functionalities (see **Error! Reference source not found.** below)

1) **Industrial Ecology:** Eco-efficiency, industrial symbiosis, technically, economically and environmentally sustainable loops… The materialisation of all these concepts requires a regulatory framework that allows durable supply chain commitments, that favour economies of scale, long-term planning comfort. These are based on and grow out of what is technically and economically favourable to all parties, in a context where the interests of society at large are fully considered.

2) **Economy of functionality:** The migration towards service-based relationships may potentially contribute to a sustainable economy. Recycling of products that are not sold and remain property of their manufacturer can greatly facilitate the establishment of efficient recycling loops.

3) **Repair and maintenance:** This is classically considered as part of the overall Circular Economy system, but actually more an issue at the consumer-end of the supply chain, facilitated by adapted (eco-) design. However, the quality of the articles will depend on the quality of their components, which relates to upstream in the supply chain, up to the alloy manufacturers.

4) **Reuse:** This concept can be seen broadly from community-scale initiatives to the organised reuse of electric vehicle batteries for home energy storage.

5) **Recycling:** Ultimately, the efficiency of the end-of-life stage will determine whether a virtuous circular economy loop could be established at local, regional, national or EU level.

Circular Economy Dimension along the supply chain

	Industrial Ecology (1)	Economy of Functionality (2)	Repair (3)	Reuse (4)	Recycling (5)
Refiners	X				X
Alloy/ compound manufacturers	X				X
Semi-manufacturers/ chemical processers	X				X
DUs/OEMs	X	X	X		X
Final product manufacturers	X	X	X	X	X
Consumers			X	X	X
Collectors etc.	X				X

As can be seen in the above table, the most critical elements in terms of circular economy for those metal industries at the high end of the supply chain will be **recycling and industrial ecology** and a number of key questions will have to be considered in an I-RMOA:

- How to ensure a steady/reliable flow of secondary materials?
- Will the future regulatory Risk Management Measure impact the flow of secondary materials?
- Will the regulatory measures allow the current diversity of materials to continue to be collected and processed in the EU?
- If the materials mix is to change, what will be the implications?
- What about elements appearing in streams where they might have a detrimental effect as a consequence of forced material choice (substitute) or phasing out (becoming unwanted element)?
- Will the measure(s) impact the viability of the existing industrial ecology, such as complex non-ferrous metals refining circuits?

<u>Substance check: Unwanted materials as impurities or minor constituents of UVCB's?</u>

With a growing diversity of primary and secondary material sources, a continuous increasing number of substances used in articles, the industry has to face the exposure potential and risk management of unwanted hazardous materials like some unwanted impurities and minor constituents.

Impurities, metals that have no functional role in the 'parent' metal containing them, and minor constituents, raise other types of questions and discussions on possible trade-offs:

- *If hazardous, can they be separated safely and given a safe use on their own?*
- *If not, can they be kept safely in the 'parent' substance/material and recirculate with them without risk (dilution effect)? (recuperation as a material)*
- *If the hazards and risks differ from the mother material, impurities or the minor constituents may need to be handled in a specific I-RMOa*
- *Or requiring specific risk management in case they need to be removed as a waste or as a filler in other materials such as slags*

The discussion on the management of impurities in hazardous elements becomes increasingly relevant for industry and society require data on what the releases and risks may be as discussed in the next points. However, the I-RMOa concepts as developed for main substances apply in an equal way to impurities.

Discussion tables:

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<u>Positioning of RMO in terms of relevancy re the Circular Economy policy</u>

Relevancy Category related to the Circular Economy dimension	**Very Relevant (negative)**	**Relevant (negative)**	**Neutral**	**Relevant (positive)**	**Very relevant (positive)**
Definition	• The substance is not or barely recycled or recyclable at end-of-life. • There are very significant known drawbacks to the substance and its use in terms of the Circular Economy.	• The substance is poorly recycled or poorly recyclable. • There are known drawbacks to the substance and its use in terms of Circular Economy.	• One cannot identify a direct or indirect contribution to the Circular Economy of the substance. • The Circular Economy dimension is not relevant	• Is recycled / can be recycled • Used in or researched for applications that allow recycling. • May display properties that make its use relevant from Circularity perspective • Considered a candidate for (improved) recycling efforts • Recycled material does not achieve same performance as the primary product • There may be economic constraints to recycling (energy input and cost e.g.)	• A high percentage of the substance is recycled at end-of-life. • May display properties/potential that make its use very relevant or even critical from a Circular Economy point of view.
Relevancy positioning of Selected RMOs					

PROPORTIONALITY SCORING OF THE CIRCULAR ECONOMY DIMENSION OF A SET OF POTENTIAL RMOS

Scoring of the Circular Economy dimension	Preservation of resource: Reusable/ Recyclable	Preservation of properties / functionalities (Same use possible ?)	Circularity over time: Longevity of use	Relevancy and proportionality from Circular Economy point of view
RMO 1				
RMO 2				
RMO 3				
RMO 4				
RMO 5				

PILLAR 3 – CLIMATE DIMENSION

SUBSTANCE RELEVANCY IN RELATION TO CLIMATE POLICIES

Relevancy Category related to the Climate dimension	**Very Relevant (negative)**	**Relevant (negative)**	**Neutral**	**Relevant (positive)**	**Very relevant (positive)**
Definition	There are very significant known drawbacks to the substance and its use in terms of resource conservation, energy use and or climate change. It can be said to directly or indirectly impact in a negative way on the Climate challenges.	There are known drawbacks to the substance and its use in terms of resource conservation and energy use. It can be said to directly or indirectly impact in a negative way on the Climate challenges.	One cannot identify a direct or indirect contribution or potential contribution of any significance in terms of addressing the Climate challenges	The substance is used in or is researched for applications that are directly or indirectly related to addressing the Climate challenges. The substance may display properties that make its use very relevant in terms of energy conservation etc.	The substance is used in or researched for applications that are known to address the Climate challenges.
Relevancy positioning of Selected RMOs					

PROPORTIONALITY SCORING OF THE CLIMATE DIMENSION OF A SET OF POTENTIAL RMOS

	Impact on energy cost during manufacturing	Impact on energy use at use phase (energy consumption per functional use)	Recuperation (or not) of the intrinsic energy during recycling	Relevancy and proportionality from Climate point of view
RMO 1				
RMO 2				
RMO 3				
RMO 4				
RMO 5				

OVERAL CONCLUSION OF INTEGRATED I-RMOA

(PILLAR 1, 2 & 3)

This section will explore the way to reach conclusions when Pillar II (Circular Economy) and/or Pillar III (Climate Change) are added to the I-RMO analysis.

For the purpose of illustrating the approach, a fictitious case and scoring is considered for a set of possible 4 types of RMOs. So as to avoid any interference of individual opinions on a practical example, the RMOs are not described.

The discussion will start with putting together the conclusions of the analysis of the three pillars, starting with Pillar I (Chemicals management):

PILLAR 1:

The outcome of the RMO discussion in Pillar 1 and the scoring are presented in the following table:

PILLAR 1 PROPORTIONALITY SYNTHESIS

Pillar I: Chemicals Management					
	Effectiveness	Efficiency	Consistency	Broader Impacts	**Conclusion Pillar 1**
RMO 1					
RMO 2					
RMO 3					
RMO 4					
RMO 5					

Discussion:

PILLAR 2:

The conclusion of the Pillar 2 discussion can be presented in the following table:

PILLAR 2 PROPORTIONALITY SYNTHESIS

Pillar 2: Circular Economy				
	Reusable / recyclable	Preservation of properties / functionalities	Longevity of use	**Conclusion Pillar 2**
RMO 1				
RMO 2				
RMO 3				
RMO 4				
RMO 5				

Discussion:

PILLAR 3:

The conclusion of the Pillar II discussion can be presented as shown in **Error! Reference source not found.**.

TABLE 1: PILLAR III PROPORTIONALITY SYNTHESIS

Pillar 3: Climate Change				
	Impact on energy cost during manufacturing	Impact on energy use at use phase	Recuperation of intrinsic energy during recycling	**Conclusion Pillar III**
RMO 1				
RMO 2				
RMO 3				
RMO 4				
RMO 5				

Discussion:

PILLARS I, II & III: The synthesis of the scorings of the 3 pillars is presented in **Error! Reference source not found.** below:

TABLE 2: SYNTHESIS OF SCORING OF 3 PILLARS

Overall Conclusion of the 3 Pillars				
	Pillar 1	Pillar 2	Pillar 3	**Overall**
RMO 1				
RMO 2				
RMO 3				
RMO 4				
RMO 5				

Discussion:

Discussion of outcome

The outcome of the three-pillar analysis may be complex to present to the ultimate decision-takers and may require a synthesis table presenting the findings in a SWOT-type of reasoning. This may allow a better understanding of the compromises a decision ultimately may have to make compared to what might be considered an ideal solution.

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SUMMARY OF ANALYSIS OF 3 PILLAR ANALYSIS

	Pillar 1: Chemicals Management		**Pillar 2: Circular Economy**		**Pillar 3: Climate Change**	
	Strength Opportunity	Weakness Threat	Strength Opportunity	Weakness Threat	Strength Opportunity	Weakness Threat
Options considered suitable overall for addressing the risk(s) identified						
RMO						
RMO						
RMO						
RMO						
Options not considered suitable overall for addressing the risk(s) identified						
RMO						
RMO						
RMO						
RMO						