



# Development of a strategic roadmap for the substitution of SVHC as part of a sustainable economy

Study for the FPS Economy

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## Glossary

**AoA:** analysis of alternatives

**ANSES:** Agency for Food, Environmental and Occupational Health & Safety (France)

**BAuA:** Federal Institute for Occupational Safety and Health (Germany)

**CMR:** carcinogenic, mutagenic or toxic to reproduction

**ECHA:** European Chemicals Agency

**I&W:** Dutch Ministry of Infrastructure and Water Management

**INERIS:** The French national institute for industrial environment and risks

**INRS:** The French National Research and Safety Institute for the Prevention of Occupational Accidents and Diseases

**PBT:** persistent, bioaccumulative and toxic

**vPvB:** very persistent and very bioaccumulative

**SEA:** socio-economic assessment

**Substitution is** “the replacement or reduction of hazardous substances in products or processes by less hazardous or non-hazardous substances or by achieving an equivalent functionality via technological or organisational measures”<sup>1</sup>

- **Drop-in substitutes:** the replacement of hazardous substances in products or processes by less hazardous or non-hazardous substances
- **Functional substitution:** achieving an equivalent functionality via technological or organisational measures
- **Regrettable substitution:** substitution of one substance by another that happens to be as or more hazardous than the one substituted.

**REACH:** Regulation n°1907/2006- REACH stands for Registration, Evaluation, Authorization and Restriction of Chemicals

**SVHC:** substances of very high concern

**UBA:** Umweltbundesamt (German Environmental Agency)

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<sup>1</sup> Lohse J. et al. Substitution of Hazardous Chemicals in Products and Processes. A report compiled for the Directorate General Environment, Nuclear Safety and Civil Protection of the Commission of the European Communities. Hamburg, March 2003.

## Public summary

### Chemicals and substances of very high concern

Tens of thousands of chemicals are currently on the European market, and new substances continue to emerge each year. Chemicals fulfil many versatile and useful functions, including roles in food preservation, fuel economy, product durability, enhancement of material and aesthetics properties, disease control, and alleviation of medical symptoms ....

Although many chemicals used today are harmless to human health and the environment, many display hazardous properties. A few hundred substances are even considered of very high concern to human health and the environment (SVHC) because of their intrinsic hazardous properties (e.g., carcinogens, reprotoxic, mutagenic, endocrine disruptors) and/or the combination of their toxicity and persistence in the environment (e.g. PBT, POP, vPvB) causing an issue for future generations.

Despite the intrinsic hazardous properties of SVHCs, the ultimate risk posed to human health and the environment is a function of their use and end-of-life treatment, the probability and consequences of exposure, and the affected populations (human and environmental).

### Chemical substitution: the necessary but complex topic

In terms of general interest, chemical substitution should be achieved whenever it can be done in a sustainable manner, i.e., when the alternative solution (switching substance or redesigning the product or process) is possible at a reasonable societal cost, balancing:

- the economic cost of substitution and potential societal impacts resulting from a change in product performance;
- the expected benefit in terms of human health, future recyclability....

Sustainable substitution is currently mandated or encouraged by several regulations at international, European and Belgian levels. These regulations restrict substance use (the Stockholm convention, European POP and REACH Regulations), make hazard and risk information mandatory and impose risk management measures (e.g., CLP and REACH Regulations, environmental permits, labour legislations).

However, existing regulations alone are insufficient because:

- they do not ensure that substitution is promoted whenever it is sustainable. Indeed, adequate data are missing, and assessment methodologies are not sufficiently holistic to fully explore viable substitution schemes.
- they do not ensure enough investment in innovation to find and implement alternatives;
- downstream users fail to substitute because they ignore or are unaware of their regulatory obligations and/or the way to address the technical challenges of substitution.

A public roadmap to substitution of substances of concern must be developed to overcome these impediments and to facilitate private-sector adoption of its legal, social and environmental responsibilities to substitute.

### A Belgian strategic roadmap to substitution of substances of concern

FPS Economy commissioned RDC Environment and EPPA to define a strategic public roadmap to enhance substitution of substances of concern. The methodology included a desk work research, interviews with relevant Belgian stakeholders and other Member States (the Netherlands, Germany, France, Sweden) and a workshop with Belgian stakeholders.

A Belgian strategy is necessary to complement actions conducted at EU-level and to address Belgium-specific challenges, whether from a risk, industrial, demographic or policy priority perspective. The main contribution of this study was to show that, in order to be efficient, the strategy should be organised as:

- a combination of information, regulatory and economic instruments;
- a combination of cross-sectorial and unspecific actions (transversal, e.g. information on substitution) and tailored actions focusing on Belgian-specific priority topics (vertical, e.g. specific call for projects).

Vertical public action is only relevant 1) for cases (combination chemical functions/sectors) that are relevant to Belgium, and 2) when public policy is likely to help the private sector. The study identified the typology of cases where vertical action is needed:

- substances are used in Belgium in applications where spontaneous innovation capacity to substitute is reduced (low to medium level of technology, downstream users);
- alternative producers are located in Belgium;
- elevated concentrations of substances of concern are found in the Belgian environment.

The study inventoried and assessed data sources that can inform the selection of these priority cases. The choice of policy instruments must be tailored to each priority case, and should notably take into account the regulatory status of SVHC at EU level (under scrutiny, restricted or banned) and the development level of alternatives (not identified, identified but not tested, used for other applications, successfully used by competitors). In particular, no financial support should be granted to laggards and once a substance is banned. For laggards, other types of instruments should be considered, such as technical support and information, more stringent permitting regulations, taxation or name and shame.

Cross-sectorial actions (transversal) are more relevant for non-priority substances for Belgium and where risk management and innovation capacity are already high and specific (e.g., for high-technology applications). These may include reinforcement of the knowledge and information bases, clarification of relevant bottom-up schemes, and an improved enforcement of regulations.

For both prioritisation and action, cooperation of regional and federal levels will be necessary because substitution is a complex issue that requires using competencies and accessing information that are shared between both levels in Belgium.

## Résumé public

### Produits chimiques et substances extrêmement préoccupantes

Des dizaines de milliers de produits chimiques sont actuellement sur le marché et de nouvelles substances continuent d'y entrer chaque année. Les produits chimiques remplissent des fonctions polyvalentes et utiles : ils contribuent à préserver les aliments plus longtemps, à réduire la consommation de carburant, à prolonger la durée de vie des produits, à améliorer les caractéristiques mécaniques d'un matériau ou son esthétique, à guérir nos maladies et à atténuer les symptômes...

Bien que de nombreux produits chimiques soient inoffensifs pour la santé humaine et l'environnement, certains présentent des propriétés dangereuses. Quelques centaines de substances sont même considérées comme très préoccupantes pour la santé humaine et l'environnement (SVHC), en raison de leurs propriétés intrinsèquement dangereuses (cancérogènes, reprotoxiques, mutagènes, perturbateurs endocriniens) et/ou de la combinaison de leur toxicité et de leur persistance dans l'environnement (PBT dont substances POP, vPvB) qui affectera ainsi les générations futures.

Cela dit, le risque effectif des SVHC pour la santé et l'environnement dépend beaucoup de leur utilisation et de leur scénario de fin de vie, de la probabilité d'exposition et des personnes ou de l'environnement affecté(s).

### La substitution : un sujet nécessaire mais complexe

En termes d'intérêt général, la substitution doit être réalisée chaque fois qu'elle peut l'être de manière durable, c'est-à-dire lorsque la solution alternative (changement de substance ou reconception du produit ou du procédé) se fait à un coût sociétal raisonnable, en équilibrant :

- le coût économique de la substitution et les autres impacts sociétaux potentiels d'un changement de la performance d'un produit ;
- le bénéfice attendu en termes de santé humaine, de recyclabilité future...

La substitution durable est actuellement encouragée par plusieurs réglementations internationales, européennes et belges qui restreignent l'usage des substances chimiques préoccupantes (convention de Stockholm, règlements européens POP et REACH), rendent la mise à disposition d'information obligatoire et imposent des mesures de gestion du risque (règlements CLP et REACH, permis environnementaux, législation du travail...). Cependant, ces réglementations ne sont pas suffisantes à elles seules, pour plusieurs raisons :

- elles ne garantissent pas que la substitution soit encouragée chaque fois qu'elle est durable, faute de données adéquates et de méthodologies suffisamment holistiques ;
- elles n'assurent pas un niveau d'investissement suffisant en matière d'innovation pour trouver et mettre en œuvre les alternatives ;
- les utilisateurs en aval peinent à substituer les substances très préoccupantes par manque de connaissance des enjeux et des obligations.

Par conséquent, une feuille de route publique en matière de substitution des substances très préoccupantes doit être élaborée en vue d'aider le secteur privé à assumer de façon effective ses responsabilités légales en matière de conformité réglementaire et de substitution.

### **Une feuille de route stratégique belge en matière de substitution**

Le SPF Economie a chargé RDC Environnement et EPPA d'établir une feuille de route stratégique belge définissant la stratégie de politique publique en matière de substitution. La méthodologie comprenait un travail de recherche documentaire, des entretiens avec les parties prenantes belges concernées et d'autres Etats membres (Pays-Bas, Allemagne, France, Suède) et un atelier avec les parties prenantes belges.

Une stratégie belge est nécessaire pour compléter les actions menées au niveau de l'UE et pour relever les défis spécifiques à la Belgique, que ce soit dans une perspective de risque, de politique industrielle, démographique ou de politique publique prioritaire. La principale contribution de cette étude a été de montrer que, pour être efficace, la stratégie doit être organisée de la manière suivante :

- une combinaison d'informations et d'instruments réglementaires et économiques ;
- une combinaison d'actions intersectorielles et non spécifiques (transversales) et d'actions sur mesure axées sur des thèmes prioritaires spécifiques à la Belgique (verticales).

L'action publique verticale n'est pertinente que 1) pour des sujets pertinents pour la Belgique 2) lorsqu'elle est susceptible de produire des résultats. L'étude a contribué à mettre en évidence la typologie des cas où une action verticale est nécessaire, c'est-à-dire quand :

- les substances sont utilisées en Belgique dans des applications où la capacité d'innovation spontanée de substitution est réduite (niveau technologique faible à moyen, utilisateurs en aval) ;
- des producteurs de solutions alternatives sont implantés en Belgique ;
- les substances sont trouvées dans l'environnement belge à une concentration inquiétante.

Les sources de données qui peuvent éclairer le choix de ces sujets prioritaires ont été inventoriées et évaluées.

Le choix des instruments de politique publique doit être adapté à chaque sujet prioritaire et doit notamment tenir compte du statut réglementaire des SVHC au niveau de l'UE (sous surveillance, utilisation restreinte ou interdite) et du niveau de développement des alternatives (non identifiées, identifiées mais non testées, utilisées pour d'autres applications, utilisées avec succès par les concurrents). En particulier, aucun soutien financier à la substitution ne devrait être accordé aux retardataires et aux utilisateurs d'une substance interdite. Pour les retardataires, d'autres types d'instruments devraient être envisagés, tels que l'information et le soutien technique, la mise en œuvre de réglementations plus strictes en matière de permis, la taxation ou encore le « name and shame ».

Les actions multisectorielles (transversales) sont plus pertinentes pour les substances non prioritaires pour la Belgique et là où la capacité de gestion des risques et d'innovation est déjà élevée et spécifique (applications de haute technologie). Les actions transversales comprennent un renforcement de la base de connaissances et d'informations, une clarification des mécanismes de soutien ascendants (bottom-up) pertinents et une meilleure application de la réglementation.

Tant pour l'établissement des priorités que pour l'action, une coopération entre les niveaux régional et fédéral sera nécessaire, car la substitution est une question complexe qui requiert la mobilisation de compétences et l'accès à des informations qui sont, en Belgique, partagées entre le niveau fédéral et le niveau régional.

## Openbare samenvatting

### Chemische stoffen en zeer zorgwekkende stoffen

Tienduizenden chemicaliën zijn momenteel op de markt en jaarlijks komen er nog steeds nieuwe stoffen op de markt. Chemische producten vervullen veelzijdige en nuttige functies: ze helpen om voedsel langer te bewaren, het brandstofverbruik te verminderen, de levensduur van het product te verlengen, de mechanische eigenschappen of esthetiek van een materiaal te verbeteren, onze ziekten te genezen en symptomen te verminderen, ....

Hoewel veel chemicaliën onschadelijk zijn voor de menselijke gezondheid en het milieu, hebben sommige chemicaliën gevaarlijke eigenschappen. Enkele honderden stoffen worden zelfs als zeer zorgwekkend voor de menselijke gezondheid en het milieu (SVHC) beschouwd vanwege hun intrinsiek gevaarlijke eigenschappen (kankerverwekkende, reproductietoxische, mutagene en hormoonontregelende eigenschappen) en/of de combinatie van hun toxiciteit en persistentie in het milieu (PBT met inbegrip van POP-bestanddelen, vPvB), die dus van invloed zal zijn op toekomstige generaties.

Het werkelijke risico van SVHC's voor de gezondheid en het milieu hangt echter grotendeels af van het gebruik ervan en het scenario aan het eind van de levensduur, de waarschijnlijkheid van blootstelling en de betrokken persoon of personen of het betrokken milieu.

### Vervanging: een noodzakelijk maar complex onderwerp

In het algemeen belang moet vervanging plaatsvinden wanneer dit op duurzame wijze kan gebeuren, d.w.z. wanneer de alternatieve oplossing (verandering van stof of herontwerp van het product of proces) tegen redelijke maatschappelijke kosten wordt uitgevoerd, waarbij een afweging moet worden gemaakt van:

- de economische kosten van vervanging en andere potentiële maatschappelijke gevolgen van een verandering in de productprestaties;
- de verwachte voordelen voor de menselijke gezondheid, de toekomstige recycleerbaarheid, ...

Duurzame vervanging wordt momenteel aangemoedigd door verschillende internationale, Europese en Belgische reglementeringen die het gebruik van de betrokken chemische stoffen beperken (Verdrag van Stockholm, Europese POP- en REACH-reglementering), de informatieverstrekking verplicht stellen en risicobeheersmaatregelen opleggen (CLP- en REACH-reglementering, milieuvergunningen, arbeidswetgeving, ...). Deze voorschriften alleen zijn echter om verschillende redenen niet voldoende:

- zij zorgen er niet voor dat vervanging wordt aangemoedigd wanneer dit duurzaam is, omdat er onvoldoende adequate gegevens en onvoldoende holistische methoden voorhanden zijn;
- zij zorgen niet voor voldoende investeringen in innovatie om alternatieven te vinden en uit te voeren;

- downstreamgebruikers hebben moeite om stoffen te vervangen die aanleiding geven tot grote bezorgdheid vanwege een gebrek aan kennis van de problemen en verplichtingen.

Daarom moet een openbare routekaart voor de vervanging van zeer zorgwekkende stoffen worden ontwikkeld om de particuliere sector te helpen bij de effectieve vervulling van zijn wettelijke verantwoordelijkheden voor de naleving en vervanging van de regelgeving.

### **Een Belgische strategische routekaart voor substitutie in België**

De FOD Economie gaf RDC Environment en EPPA de opdracht om een Belgische strategische routekaart op te stellen die de strategie van het overheidsbeleid inzake vervanging bepaalt. De methodologie omvatte documentair onderzoek, interviews met relevante Belgische belanghebbenden en andere lidstaten (Nederland, Duitsland, Frankrijk, Zweden) en een workshop met Belgische belanghebbenden.

Een Belgische strategie is nodig om de acties op EU-niveau aan te vullen en de specifieke uitdagingen van België aan te pakken, zowel vanuit een risico-, industrieel, demografisch of prioritair overheidsbeleids perspectief. De belangrijkste bijdrage van deze studie was om aan te tonen dat, om effectief te zijn, de strategie als volgt georganiseerd moet zijn:

- een combinatie van informatie en regelgevende en economische instrumenten;
- een combinatie van intersectorale en niet-specifieke (transversale) acties en acties op maat gericht op prioritaire thema's specifiek voor België (verticaal).

Verticaal overheidsoptreden is alleen relevant voor 1) onderwerpen die relevant zijn voor België 2) waar het waarschijnlijk resultaten zal opleveren. De studie hielp om de typologie van de gevallen te belichten waarin verticale actie nodig is, d.w.z. wanneer:

- de stoffen in België worden gebruikt in toepassingen waar de capaciteit voor spontane substitutie-innovatie beperkt is (laag tot middelmatig technologisch niveau, downstreamgebruikers);
- de producenten van alternatieve oplossingen zijn gevestigd in België;
- de stoffen in het Belgische milieu in een zorgwekkende concentratie worden aangetroffen.

Er zijn gegevensbronnen geïdentificeerd en geëvalueerd die als basis kunnen dienen voor de keuze van deze prioritaire onderwerpen.

De keuze van de instrumenten voor het overheidsbeleid moet worden aangepast aan elk prioritair thema en moet met name rekening houden met de wettelijke status van SVHC's op EU-niveau (onder toezicht, beperkt of verboden gebruik) en het niveau van ontwikkeling van alternatieven (niet-geïdentificeerd, geïdentificeerd maar niet getest, gebruikt voor andere toepassingen, met succes gebruikt door concurrenten). Er mag met name geen financiële steun voor vervanging worden verleend aan achterblijvers en gebruikers van een verboden stof. Voor achterblijvers moeten andere soorten instrumenten worden overwogen, zoals informatie en technische ondersteuning, de invoering van strengere vergunningsregels, belastingheffing en naam en toenaam.

Multisectorale (transversale) acties zijn relevanter voor niet-prioritaire stoffen voor België en waar de risicomanagement- en innovatiecapaciteit al hoog en specifiek is (hightechnoepassingen). Horizontale acties omvatten het versterken van de kennis- en informatiebasis, het verduidelijken van de relevante bottom-upondersteuningsmechanismen en het verbeteren van de handhaving van de regelgeving.

Zowel voor het bepalen van de prioriteiten als voor het nemen van maatregelen zal samenwerking tussen het gewestelijke en het federale niveau noodzakelijk zijn, aangezien vervanging een complexe kwestie is die de mobilisatie van expertise en de toegang tot informatie vereist die tussen het federale en het gewestelijke niveau in België wordt gedeeld.

## Summary for decision-makers

### Executive summary

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#### **Chemicals and substances of very high concern**

Tens of thousands of chemicals are currently on the European market, and new substances continue to emerge each year. Chemicals fulfil many versatile and useful functions, including roles in food preservation, fuel economy, product durability, enhancement of material and aesthetics properties, disease control, and alleviation of medical symptoms ....

Although many chemicals used today are harmless to human health and the environment, many display hazardous properties. A few hundred substances are even considered of very high concern to human health and the environment (SVHC) because of their intrinsic hazardous properties (e.g., carcinogens, reprotoxic, mutagenic, endocrine disruptors) and/or the combination of their toxicity and persistence in the environment (e.g. PBT, POP, vPvB) causing an issue for future generations.

Despite the intrinsic hazardous properties of SVHCs, the ultimate risk posed to human health and the environment is a function of their use and end-of-life treatment, the probability and consequences of exposure, and the affected populations (human and environmental).

#### **Chemical substitution from the perspective of public authorities: the necessary but complex topic**

In terms of general interest, chemical substitution should be achieved whenever it can be done in a sustainable manner, i.e., when the alternative solution (switching substance or redesigning the product or process) is possible at a reasonable societal cost, balancing:

- the economic cost of substitution and potential societal impacts resulting from a change in product performance;
- the expected benefit in terms of human health, future recyclability....

Sustainable substitution is currently mandated or encouraged by several regulations at international, European and Belgian levels. These regulations restrict substance use (the Stockholm convention, European POP and REACH Regulations), make hazard and risk information mandatory and impose risk management measures (e.g., CLP and REACH Regulations, environmental permits, labour legislations).

However, existing regulations alone are insufficient because:

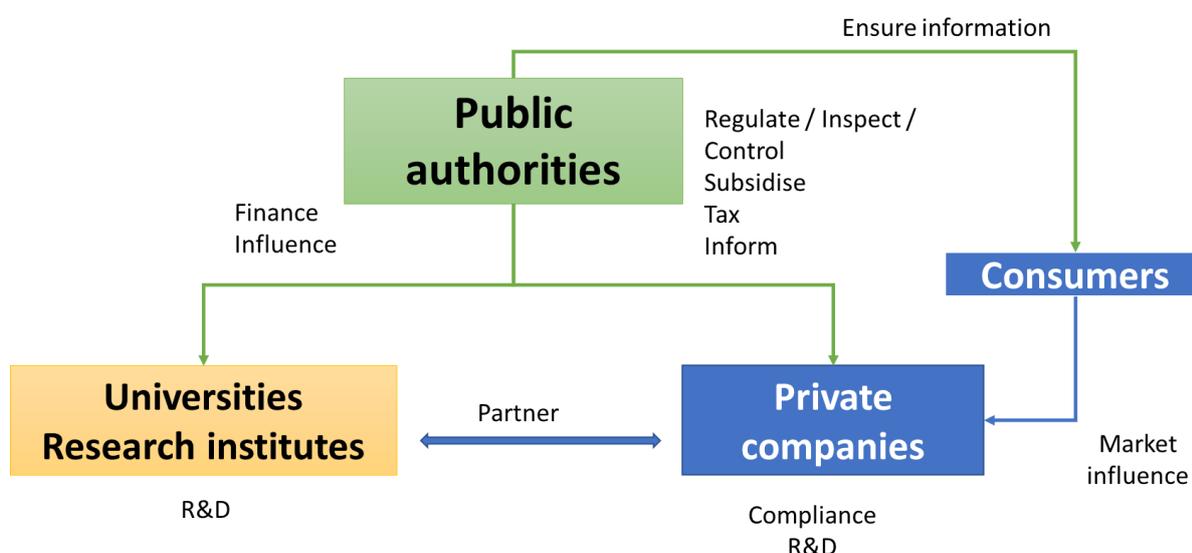
- they do not ensure that substitution is promoted whenever it is sustainable (analysis of alternatives and socio-economic assessment are not holistic enough, data are missing, and enforcement, notably for imported products, is insufficient);
- regulatory processes do not ensure that enough resources are invested in finding, testing and implementing alternatives in order to decrease their cost and make them worthwhile. Indeed, innovation, whether derived from fundamental research or applied R&D, is a central pillar of substitution.
- some stakeholders, especially substance users of low to medium levels of technology (downstream users and cases where one substance is used in relatively large volumes by

multiple users for similar purposes) are not sufficiently aware of their obligations and not in an adequate position in their supply chain to drive substitution.

A public roadmap to substitution of substances of concern must be developed to overcome these impediments and to facilitate private-sector adoption of its legal, social and environmental responsibilities to substitute.

Figure 1 outlines the various entities involved and their responsibilities for promoting substitution.

**Figure 1: Distribution of responsibilities between public authorities, private companies, research organisations and consumers for promoting chemical substitution**



**Chemical substitution from the business perspective: a risk and/ or an opportunity**

Industry bears primary responsibility for substituting SVHCs with non-hazardous or less hazardous solutions

On the one hand, chemical substitution is a regulatory risk that businesses should anticipate in order to adapt their production processes and plan investments accordingly.

On the other hand, substitution is an opportunity for companies to reduce their cost (related to risk management measures) and gain a competitive advantage. Recent examples indicate that early implementers of non-hazardous alternatives for their products generally receive favourable treatment from consumers and the marketplace (example: demand for cosmetic products without phthalates and without aluminium salts).

Consequently, if substitution can be a marketplace differentiator that justifies the costs of R&D, it is in the interest of companies to innovate alone and faster than their competitors. Where marketplace advantage is not a factor, companies should be encouraged to collaborate on initiatives that foster substitution. Public policies and regulatory incentives should be tailored to leverage this.

### **Substitution at a crossroad of sustainability and innovation / competitiveness policies.**

The 7th Environment Action Programme (7th EAP), adopted in 2013 by the European Parliament and the Council, mandates the European Commission, to develop by 2018<sup>2</sup> “a Union strategy for a non-toxic environment that is conducive to innovation and the development of sustainable substitutes including non-chemical solutions.”

Firstly, substitution contributes to **Public Health policy** by preventing current and future health risks for consumers and workers alike.

Secondly, substitution contributes to protect **ecosystems and biodiversity** (e.g., neonicotinoids for bees, insecticides emissions to water).

Finally, substitution is one key objective of the **Circular Economy Action Plan**. By ensuring that substances of concern are eliminated or reduced at the source, we make sure that future generations can safely and legally reuse or recycle materials, which in turns contribute to **resource efficiency** and mitigation of **climate change**.

Additionally, because substitution can provide economic opportunity for businesses, it should be envisaged also as an important element of any **innovation and competitiveness** policy.

### **A Belgian strategic roadmap to substitution of SVHC**

FPS Economy commissioned RDC Environment and EPPA to define a strategic public roadmap to substitution of SVHC. The methodology included a desk work research, interviews with relevant Belgian stakeholders and other Member States (the Netherlands, Germany, France, Sweden) and a workshop with Belgian stakeholders.

The study concludes that a public strategy to substitution is necessary to complement existing regulatory instruments, which, as previously highlighted, show multiple gaps.

The European strategy for substitution of SVHC, coordinated by ECHA, will be insufficient and inadequate to address Belgian challenges, whether from a risk, industrial, demographic or policy priority perspective. Therefore, a Belgian strategy needs to be developed.

The main contribution of this study was to show that an effective strategy should be organised as:

- a combination of information, regulatory and economic instruments;
- a combination of cross-sectorial and unspecific actions (transversal, e.g. information on substitution) and tailored actions focusing on Belgian-specific priority topics (vertical, e.g. specific call for projects).

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<sup>2</sup> The strategy is not expected before the new Commission is elected

Vertical public action is only relevant for 1) cases that are relevant to Belgium, and 2) when public policy is likely to help the private sector. The study identified the typology of cases where vertical action is needed:

- substances used in Belgium in applications of low level of technology (e.g., chrome plating) to medium level of technology (e.g., paints), or by downstream users (e.g., furniture) because:
  - substance users (especially substances as part of articles) tend to lack the sophistication required to ascertain what substitution possibilities exist, and they certainly would be challenged to introduce them by trial and error in their production chain;
  - substitution usually provides no competitive edge, which means investment in R&D is not spontaneous; collaboration between users and substance producers should be encouraged;
  - even if there are recognised possibilities for partial substitution, they are difficult to implement due to lack of knowledge, cost of dual production lines, lack of recognised durability, etc.

In summary, these are applications where spontaneous innovation capacity to substitute is reduced.

- substances that can be replaced by alternatives produced in Belgium;
- elevated concentrations of substances of concern are found in the Belgian environment.

On the contrary, a targeted public action is not warranted when substances are associated with high-technology functions in Belgium (e.g., solvent used in a pharmaceutical process), because:

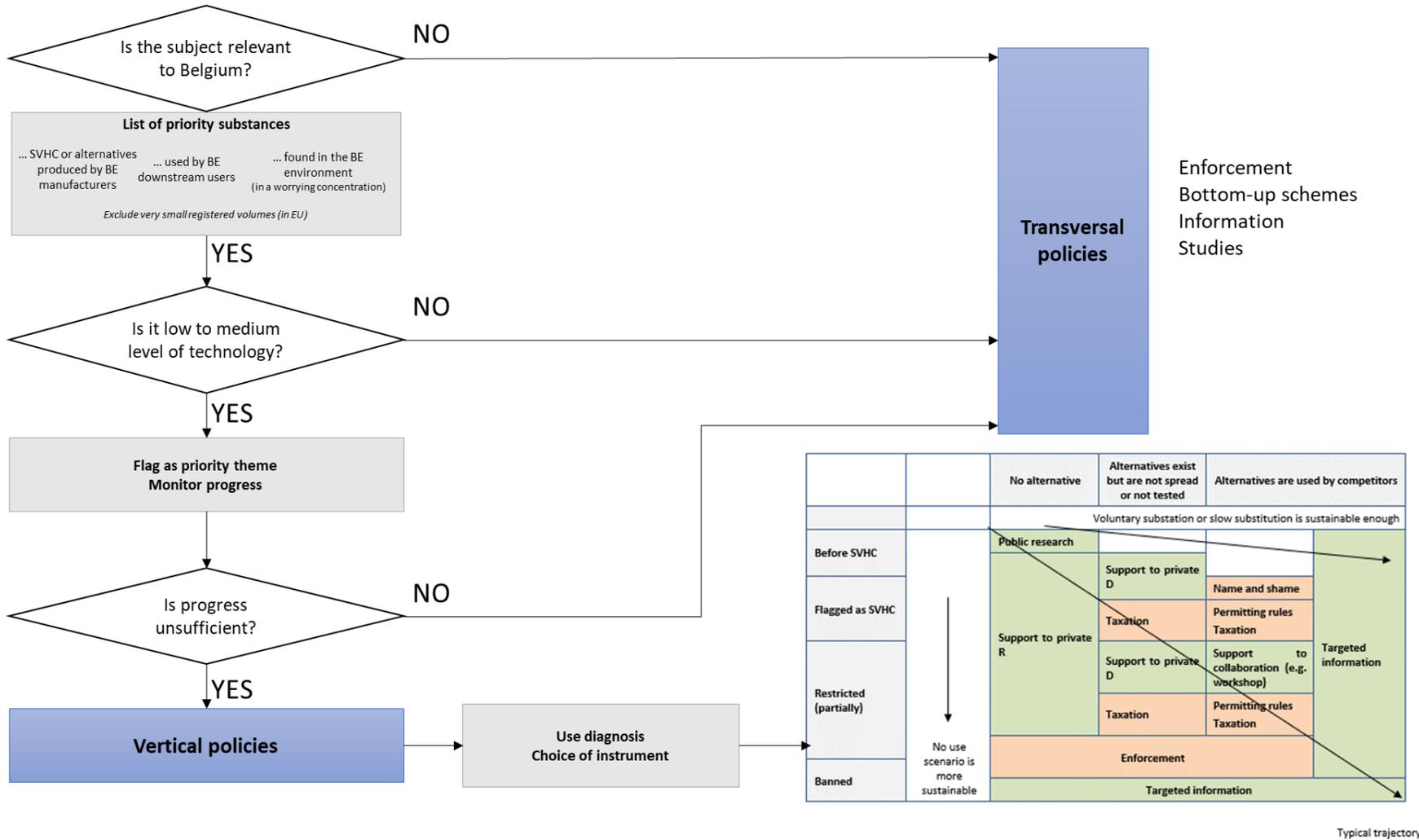
- industrials usually perceive substitution as a business opportunity, giving them competitive edge. They conduct their own research, on which they can hardly be challenged by public authorities due to the level of technology of product and processes;
- risk is low because substances are used in low volumes, in a closed and/or controlled environment where safety performance is above average, and where adequate risk management measures are in place;
- any action from the public authorities would be specific, hardly replicable and therefore not cost efficient.

Transversal actions are in that case more suitable. These may include reinforcement of the knowledge and information bases, clarification of relevant bottom-up schemes, and an improved enforcement of regulations.

A list of priority themes for public action and innovation, listed as functions (solvents, fire safety, plasticizers, etc.), should be established based on the set of criteria proposed in this study. Data sources that can inform the selection of these priority subjects were inventoried and assessed.

Then, a diagnosis should contribute to more precisely inform on the role of Belgian supply-chain stakeholders and the list of priorities could be refined accordingly. Substitution efforts and progress on setting priority themes should be monitored frequently to streamline actions and effectiveness.

Figure 2: A Belgian roadmap to substitution of SVHC - summary



The choice of policy instruments must be tailored to each priority subject, and should notably take into account the regulatory status of SVHC at EU level (under scrutiny, restricted or banned) and the development level of alternatives (not identified, identified but not tested, used for other applications, successfully used by competitors). In particular, no financial support should be granted to laggards and once a substance is banned. For laggards, other types of instruments should be considered, such as technical support and information, more stringent permitting regulations, taxation or name and shame.

**Figure 3: Vertical action - choice of policy instruments**

		No alternative	Alternatives exist but are not spread or not tested	Alternatives are used by competitors	
		Voluntary substitution or slow substitution is sustainable enough			
Before SVHC	No use scenario is more sustainable ↓	Public research			
Flagged as SVHC		Support to private R	Support to private D	Name and shame	Targeted information
			Taxation	Permitting rules Taxation	
Support to private D			Support collaboration (e.g. workshop)		
Taxation			Permitting rules Taxation		
Restricted (partially)	Enforcement				
Banned	Targeted information				

Typical trajectory

For both prioritisation and action, cooperation of regional and federal levels is necessary, because substitution is a complex issue that requires using competencies and information that are shared between both levels in Belgium.

Members to the Belgian REACH committee have most of the skills necessary to implement the present roadmap (public policy, toxicology, etc.). However, additional competencies related to communication and innovation policy should be developed to fully address the challenges of substitution. These may be achieved via recruitment, training and/or active cooperation with other regional and federal teams that are not currently part of the REACH cooperation agreement (departments in charge of innovation policy, economic departments, other sustainability services, communication).

## List of recommendations

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**Recommendation 1.** Chemical substitution should be encouraged whenever and only if it is sustainable.

**Recommendation 2.** In order to avoid regrettable substitution, prioritisation should not be organised around individual substances but rather on key functions or sectors.

Functional substitution (reformulation, changing product or process) is preferable to drop-in substitution (replacing one substance by another) because drop-in substitution often leads to regrettable substitution (replacing one substance by a substance that is not yet regulated but as hazardous (or more)).

**Recommendation 3.** Belgium should accept in its substitution strategy all substances of concern to human health and the environment and all relevant endpoints and not limit the roadmap to SVHC prioritised by the REACH Regulation. Priorities should be set on SVHC and complemented by other relevant substances.

**Recommendation 4.** Substitution, reduction of hazardous substances and risk management should be envisaged within a hierarchy--similarly to the principle "Avoid, reduce, compensate"--that drives biodiversity protection strategies in Europe.

**Recommendation 5.** Belgium should look at substitution as a long-term challenge.

Where substitution of SVHCs is not yet practicable, information should be developed on substances uses and the issue of legacy substances should be monitored. For instance, their use should be limited to closed-loop processes that minimize the potential for human and environmental exposure and discharge into the environment.

**Recommendation 6.** A public strategy to support substitution should be implemented.

**Recommendation 7.** Awareness of the risks SHVCs pose to humans and environments needs to be raised at political level to unlock the necessary resources and support for the substitution strategy.

**Recommendation 8.** Focusing public actions on priority subjects (combinations function/sector e.g. fire safety in construction plastics) in terms of sustainability and relevance for Belgium will be key.

**Recommendation 9.** Priorities should be set at national level in order to centralise information and facilitate enforcement. Priority setting should be coordinated by the federal level, with active contribution and validation of other parties.

**Recommendation 10.** The Belgian prioritisation approach should combine the following: (1) review of existing data sources to develop a preliminary list of priority subjects (combination function/sector) and (2) consult with stakeholders to prioritise the chemical and streamline the list.

**Recommendation 11.** Transversal measures should be favoured for high-technology / low volume uses.

**Recommendation 12.** A vertical (top-down and prioritised) approach should be favoured for low to medium level technology / with high to medium volumes (downstream uses).

**Recommendation 13.** The public strategy should be conceived as a combination of transversal and vertical (top-down) actions

**Recommendation 14.** For each prioritised subject (combinations function/sector), the choice of instruments will depend on the status of the alternative technology readiness level, potential for substitution to provide a competitive advantage, and the position of Belgian stakeholders in the supply chain .

**Recommendation 15.** As a general principle, public financial support should not (and cannot legally) be granted to help laggards comply with the legislation. This principle also helps ensure that visionary companies are incentivized to become innovators and early adopters.

**Recommendation 16.** The main strategy for providing financial support for substitution should be two-pronged as follows: 1) clarify existing bottom-up schemes for stakeholders; 2) facilitate access to these mechanisms for motivated stakeholders. Specific top-down financial actions may be envisaged only for priority subjects if the bottom-up approach proves insufficient.

**Recommendation 17.** Support both private individual and collaborative R&D without financial priority. Specific top-down collaborative financial support may be envisaged only for priority subjects if the bottom-up approach proves insufficient.

**Recommendation 18.** The challenges of substitution should be communicated to bodies in charge of coordinating public research policy, so that they can engage in necessary substitution research.

**Recommendation 19.** Technical support instruments should be provided, striving to engage SMEs and downstream users who most need it.

**Recommendation 20.** Belgium should collaborate with other Member States on subjects that are non-competitive for the industry (downstream uses, low to medium level of technology...)

**Recommendation 21.** A mindset of complementarity and shared responsibility needs to be introduced within the roadmap, clearly establishing the roles of each party.

**Recommendation 22.** Priority-setting should be coordinated by the federal level because it can centralise data coming from regions, another MS, the EU and OECD.

**Recommendation 23.** The creation of a network of experts on priority substances or group of substances would be valuable for risk assessment.

## Résumé à l'intention des décideurs

### Sommaire exécutif

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#### **Produits chimiques et substances extrêmement préoccupantes**

Des dizaines de milliers de produits chimiques sont actuellement sur le marché et de nouvelles substances continuent d'y entrer chaque année. Les produits chimiques remplissent des fonctions polyvalentes et utiles : ils contribuent à préserver les aliments plus longtemps, à réduire la consommation de carburant, à prolonger la durée de vie des produits, à améliorer les caractéristiques mécaniques d'un matériau ou son esthétique, à guérir nos maladies et à atténuer les symptômes...

Bien que de nombreux produits chimiques soient inoffensifs pour la santé humaine et l'environnement, certains présentent des propriétés dangereuses. Quelques centaines de substances sont même considérées comme très préoccupantes pour la santé humaine et l'environnement (SVHC), en raison de leurs propriétés intrinsèquement dangereuses (cancérogènes, reprotoxiques, mutagènes, perturbateurs endocriniens) et/ou de la combinaison de leur toxicité et de leur persistance dans l'environnement (PBT dont substances POP, vPvB) qui affectera ainsi les générations futures.

Cela dit, le risque effectif des SVHC pour la santé et l'environnement dépend beaucoup de leur utilisation et de leur scénario de fin de vie, de la probabilité d'exposition et des personnes ou de l'environnement affecté(s).

#### **La substitution du point de vue des pouvoirs publics : un sujet nécessaire mais complexe**

En termes d'intérêt général, la substitution doit être réalisée chaque fois qu'elle peut l'être de manière durable, c'est-à-dire lorsque la solution alternative (changement de substance ou reconception du produit ou du procédé) se fait à un coût sociétal raisonnable, en équilibrant :

- le coût économique de la substitution et les autres impacts sociétaux potentiels d'un changement dans la performance d'un produit ;
- le bénéfice attendu en termes de santé humaine, de recyclabilité future....

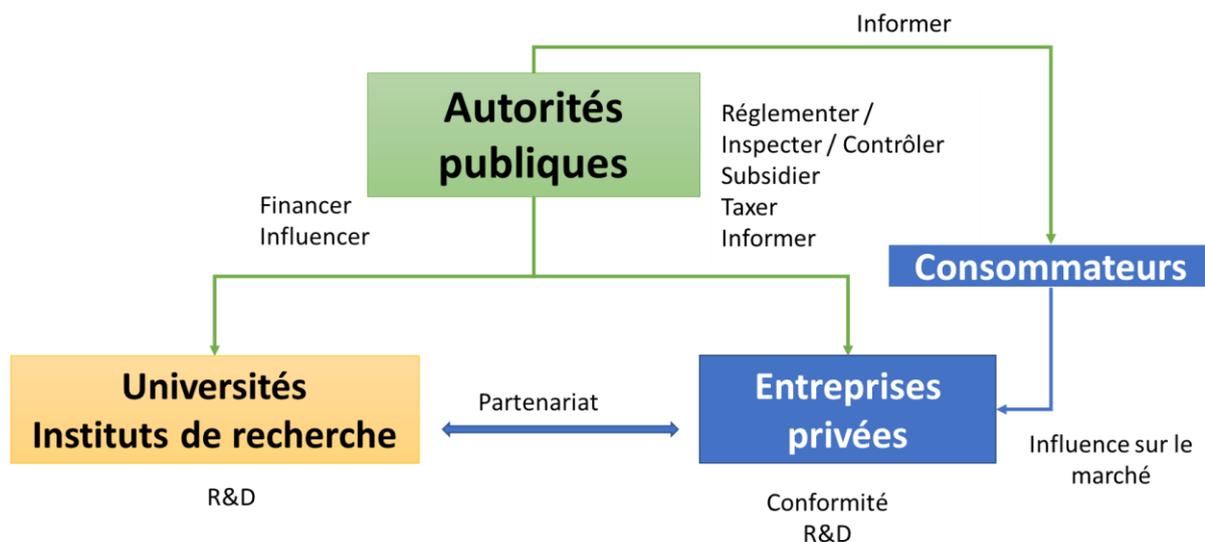
La substitution durable est actuellement encouragée par plusieurs réglementations internationales, européennes et belges qui restreignent l'usage des substances chimiques préoccupantes (convention de Stockholm, règlements européens POP et REACH), rendent la mise à disposition d'information obligatoire et imposent des mesures de gestion du risque (règlements CLP et REACH, permis environnementaux, législation du travail...). Cependant, ces réglementations ne sont pas suffisantes à elles seules, pour plusieurs raisons :

- Elles ne garantissent pas la promotion de la substitution à chaque fois qu'elle est durable (l'analyse des alternatives et l'évaluation socio-économique ne sont pas suffisamment holistiques, les données manquent et l'application de la législation, notamment pour les produits importés, n'est pas suffisante)

- Les processus réglementaires ne garantissent pas que des moyens suffisants sont investis dans la recherche, les tests et la mise en œuvre d'alternatives afin de réduire leur coût et de les rendre rentables. En effet, l'innovation, de la recherche fondamentale à la R&D appliquée, est un pilier fondamental de la substitution.
- Certaines parties prenantes, et en particulier les utilisateurs de technologies de niveau faible à moyen (utilisateurs en aval, volumes élevés, le plus souvent beaucoup d'utilisations similaires) ne sont pas suffisamment conscients de leurs obligations et peuvent difficilement piloter la substitution.

Par conséquent, une stratégie publique de substitution doit être élaborée. Elle devrait viser à combiner efficacement les instruments de politique publique que sont l'information, la réglementation et les instruments économiques en vue d'aider le secteur privé à assumer efficacement ses responsabilités juridiques.

**Figure 4: Répartition des responsabilités entre pouvoirs publics, entreprises privées, organismes de recherche et consommateurs**



#### La substitution du point de vue des entreprises : un risque et/ou une opportunité

Le remplacement des SVHC par des solutions non dangereuses ou moins dangereuses relève de la responsabilité de l'industrie.

D'une part, la substitution est donc un risque réglementaire pour les entreprises, qu'elles doivent anticiper, afin d'adapter leurs processus et de planifier leurs investissements.

D'autre part, la substitution est une opportunité pour les entreprises de réduire leurs coûts (liés aux mesures de gestion des risques) et de se démarquer de la concurrence. Les entreprises qui réussissent à développer des alternatives avant la concurrence obtiennent un avantage concurrentiel, notamment parce que les consommateurs, informés par les processus réglementaires et les ONG, préfèrent les produits exempts de substances préoccupantes (par exemple : demande de produits cosmétiques sans phtalates et sans sels d'aluminium).

Par conséquent, si la substitution est un facteur suffisamment différenciateur pour justifier les coûts de la R&D et des essais individuels, il est dans l'intérêt des entreprises d'innover seules et plus rapidement que leurs concurrents.

Dans le cas contraire, soit les entreprises parviennent à trouver un intérêt spontané pour la collaboration, soit les politiques publiques devraient les encourager à le faire.

### **La substitution à la croisée des politiques de développement durable et d'innovation/compétitivité.**

Le 7<sup>e</sup> programme d'action pour l'environnement (7<sup>e</sup> PAE), adopté en 2013 par le Parlement européen et le Conseil, charge la Commission européenne d'élaborer, d'ici 2018, « une stratégie de l'Union pour un environnement non toxique propice à l'innovation et au développement de produits de substitution durables, notamment des solutions non chimiques ».

Premièrement, la substitution contribue à la **politique de santé publique** en prévenant les risques actuels et futurs pour la santé des consommateurs et des travailleurs.

Deuxièmement, la substitution contribue à protéger **les écosystèmes et la biodiversité** (néonicotinoïdes pour les abeilles, émissions d'insecticides dans l'eau, etc.)

Enfin, la substitution est un objectif clé du Plan d'action pour **l'économie circulaire**. En veillant à ce que les substances préoccupantes soient évitées ou réduites à la source, nous veillons à ce que les générations futures puissent réutiliser ou recycler en toute sécurité et légalement les matériaux, ce qui contribue à son tour à **l'efficacité des ressources** et à **l'atténuation du changement climatique**.

En outre, comme la substitution peut être une opportunité pour les entreprises, elle devrait également être envisagée comme une **politique d'innovation et de compétitivité**.

### **Une feuille de route stratégique belge vers la substitution**

Le SPF Economie a chargé RDC Environment et EPPA de définir une feuille de route publique en matière de substitution. La méthodologie comprenait un travail de recherche documentaire, des entretiens avec les parties prenantes belges concernées et d'autres Etats membres (Pays-Bas, Allemagne, France, Suède) et un atelier avec les parties prenantes belges.

L'étude conclut qu'une stratégie publique de substitution est nécessaire pour compléter les instruments réglementaires existants, qui, comme nous l'avons déjà souligné, présentent de multiples lacunes.

La stratégie européenne de substitution, coordonnée par l'ECHA, ne sera ni suffisante ni adéquate pour relever les défis belges, que ce soit dans une perspective de risque, de politique industrielle, démographique ou de politique publique prioritaire. Une stratégie belge doit donc être développée.

La principale contribution de cette étude a été de montrer que, pour être efficace, la stratégie doit être organisée sous forme de combinaison :

- d'instruments d'information, réglementaires et économiques ;

- d'actions multisectorielles et non spécifiques (transversales) et d'actions sur mesure axées sur des thèmes prioritaires spécifiques à la Belgique (verticales).

L'action publique verticale n'est pertinente que 1) pour des sujets pertinents pour la Belgique 2) lorsqu'elle est susceptible de produire des résultats. L'étude a contribué à mettre en évidence la typologie des cas où une action verticale est nécessaire, à savoir :

- Lorsque des substances préoccupantes sont utilisées en Belgique dans des applications de faible niveau technologique (par exemple le chromage) à moyen niveau technologique (par exemple les peintures), ou par des utilisateurs en aval (par exemple le mobilier) parce que :
  - les utilisateurs de substances (en particulier les substances faisant partie d'articles) ont tendance à ne pas avoir le niveau de sophistication requis pour déterminer les possibilités de substitution existantes et seraient certainement en difficulté pour les mettre en place sous forme d'essais et erreurs dans leur chaîne de production ;
  - la substitution n'offre généralement aucun avantage concurrentiel dans ces cas de figure, ce qui signifie que l'investissement dans la R&D n'est pas spontané et que la collaboration entre les utilisateurs et les producteurs de substances devrait être encouragée ;
  - même s'il existe des possibilités reconnues de substitution partielle, elles sont difficiles à mettre en œuvre en raison du manque de connaissances, du coût des lignes de production doubles, du manque de durabilité reconnue, etc.

En résumé, il s'agit d'applications où la capacité d'innovation spontanée de substitution est réduite.

- Lorsque des substances préoccupantes peuvent être remplacées par des alternatives produites en Belgique, qu'il convient donc de soutenir ;
- Lorsque des substances préoccupantes sont trouvées dans l'environnement belge à une concentration inquiétante.

Au contraire, une action publique ciblée n'est pas pertinente lorsque des substances remplissent une fonction de haute technologie en Belgique (par exemple, un solvant utilisé dans un procédé pharmaceutique particulier), car :

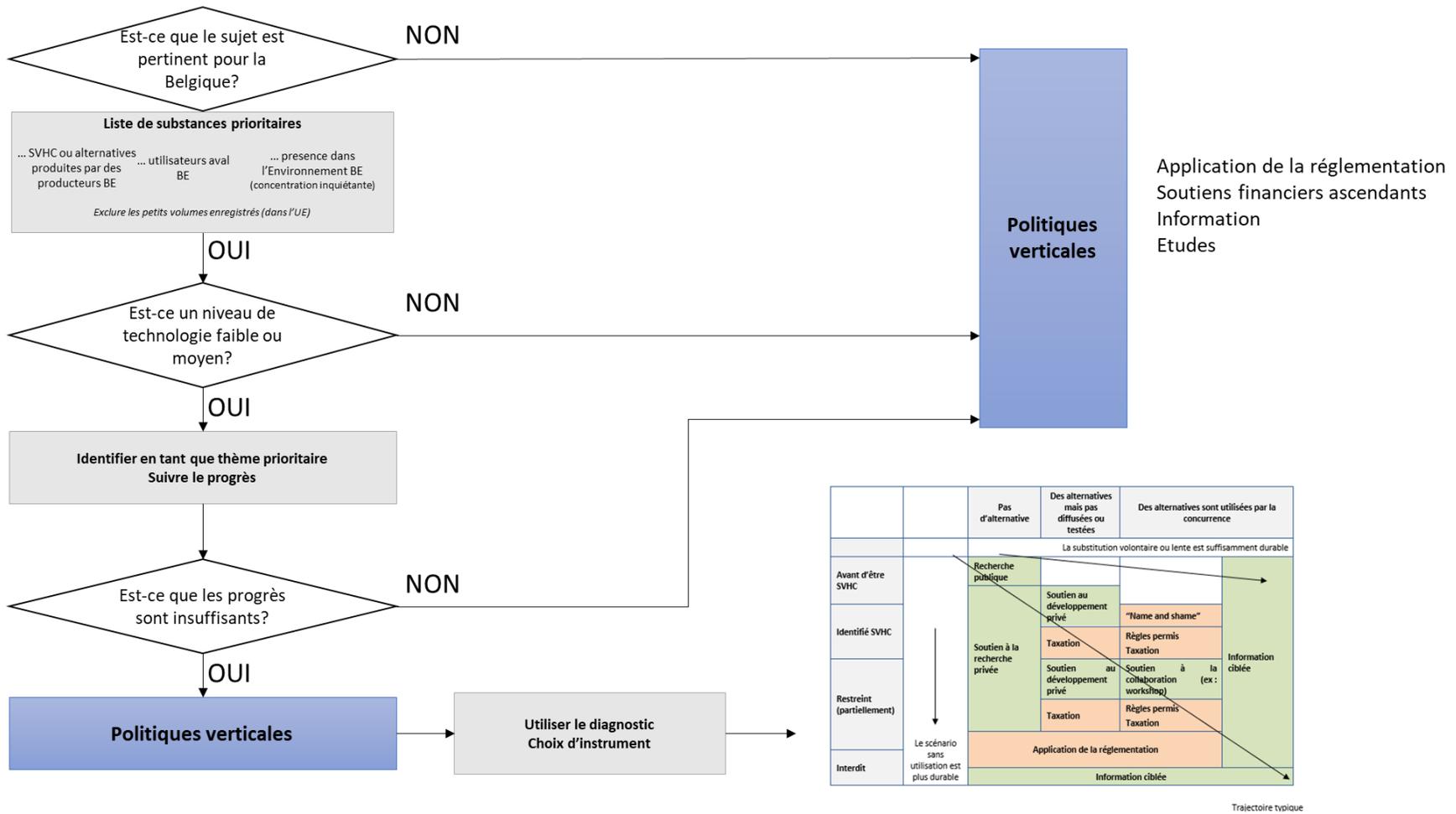
- Les industriels perçoivent généralement la substitution comme une opportunité déjà existante, avec un avantage concurrentiel. Ils mènent leurs propres recherches, sur lesquelles les pouvoirs publics peuvent difficilement les aider ou les contester en raison du niveau technologique des produits et des processus ;
- Le risque est faible parce que les substances sont habituellement utilisées en faibles quantités, dans un environnement fermé et/ou contrôlé où le rendement en matière de sécurité est supérieur à la moyenne et où des mesures adéquates de gestion des risques sont en place ;
- Toute action des pouvoirs publics serait spécifique, difficilement reproductible et donc non rentable.

Les actions transversales sont alors plus appropriées. Elles comprennent un renforcement de la base de connaissances et d'information disponible, une clarification des systèmes de soutiens financier ascendants pertinents (bottom-up) et une meilleure application de la réglementation.

Une liste des thèmes prioritaires pour l'action publique et l'innovation, classés par fonctions (solvants, sécurité incendie, plastifiants...) devrait être établie sur la base de l'ensemble des critères proposés dans cette étude. Les sources de données qui peuvent éclairer le choix de ces sujets prioritaires ont été inventoriées et évaluées.

Ensuite, un diagnostic devrait contribuer à une information plus précise sur le rôle des acteurs belges dans la chaîne d'approvisionnement et la liste des priorités pourrait ainsi être affinée. Les efforts de substitution et les progrès réalisés sur les thèmes prioritaires devraient être fréquemment suivis afin de décider où et comment agir au mieux.

Figure 5: Feuille de route belge en matière de substitution - résumé



Le choix des instruments politiques doit être adapté à chaque thème prioritaire et tenir compte notamment du statut réglementaire des SVHC au niveau de l'UE (sous surveillance, restreintes ou interdites) et du niveau de développement des SVHC (non identifiés, identifiés mais non testés, utilisés pour d'autres applications, utilisés avec succès par les concurrents). En particulier, aucun soutien financier ne devrait être accordé aux retardataires et une fois qu'une substance est interdite. Pour les retardataires, d'autres types d'instruments devraient être envisagés, tels que le l'information et le soutien technique, une réglementation plus stricte en matière de permis, la taxation ou encore le « name and shame » (dénonciation publique).

**Figure 6: Action verticale - choix des instruments de politique publique**

		Pas d'alternative	Des alternatives mais pas diffusées ou testées	Des alternatives sont utilisées par la concurrence
		La substitution volontaire ou lente est suffisamment durable		
Avant d'être SVHC		Recherche publique		
Identifié SVHC		Soutien à la recherche privée	Soutien au développement privé	« Name and shame »
			Taxation	Règles permis Taxation
Restreint (partiellement)			Soutien au développement privé	Soutien à la collaboration (ex : workshop)
			Taxation	Règles permis Taxation
Interdit	Le scénario sans utilisation est plus durable	Application de la réglementation		
		Information ciblée		

Trajectoire typique

Tant pour l'établissement des priorités que pour l'action, une coopération entre les niveaux régional et fédéral est nécessaire, car la substitution est une question complexe nécessitant des compétences et des informations partagées (en Belgique) entre les niveaux fédéral et régional.

Les membres du comité belge REACH disposent de la plupart des compétences nécessaires à la mise en œuvre de la présente feuille de route (politique publique, toxicologie...). Cependant, les compétences en matière de communication et de politique de l'innovation devraient être développées, ce qui peut être réalisé par le recrutement, la formation ou par une coopération active avec d'autres équipes régionales et fédérales qui ne font pas actuellement partie de l'accord de coopération REACH (services en charge de la politique d'innovation, services économiques, autres services de durabilité, communication...).

## Liste de recommandations

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**Recommandation 1.** La substitution ne devrait être encouragée que si elle est durable.

**Recommandation 2.** Afin d'éviter une substitution regrettable, la hiérarchisation des priorités ne devrait pas être organisée autour de substances individuelles, mais plutôt autour de fonctions ou de secteurs clés.

La substitution fonctionnelle (reformulation, changement de produit ou de procédé) est préférable à la substitution directe (remplacement d'une substance par une autre) car la substitution directe entraîne souvent une substitution regrettable (remplacement d'une substance par une substance qui n'est pas encore réglementée mais qui est aussi – ou plus - dangereuse.

**Recommandation 3.** La Belgique devrait accepter dans sa stratégie de substitution toutes les substances préoccupantes pour la santé humaine et l'environnement et tous les effets finaux pertinents et ne pas limiter la feuille de route aux substances extrêmement préoccupantes classées comme prioritaires par le règlement REACH. Des priorités devraient être fixées pour les SVHC et complétées par d'autres substances pertinentes.

**Recommandation 4.** La substitution, la réduction des substances dangereuses et la gestion des risques doivent être envisagées avec une hiérarchie, à l'image du principe « Éviter, réduire, compenser » qui anime les stratégies de protection de la biodiversité en Europe et en France.

**Recommandation 5.** La Belgique devrait considérer la substitution comme un défi à long terme.

S'il n'est pas possible de parvenir à une substitution immédiate, il convient d'améliorer la connaissance sur l'utilisation des substances et de surveiller la question des substances héritées (ou substances vestiges), par exemple en favorisant l'utilisation des SVHC dans des boucles (ou cycle de vie) contrôlé(e)s.

**Recommandation 6.** Une stratégie publique de soutien à la substitution devrait être mise en place.

**Recommandation 7.** Il convient de sensibiliser le niveau politique pour débloquer les moyens et le soutien nécessaires à la stratégie de substitution.

**Recommandation 8.** En Belgique, il sera essentiel de concentrer les actions publiques sur des sujets prioritaires en termes de durabilité et de pertinence pour la Belgique.

**Recommandation 9.** Des priorités sont fixées au niveau national afin de centraliser les informations et de faciliter la mise en œuvre. L'établissement des priorités devrait être coordonné par le niveau fédéral, avec la contribution active et la validation des autres parties.

**Recommandation 10.** L'approche belge de fixation des priorités devrait combiner (1) l'examen des sources de données existantes pour établir les premières listes de sujets clés et (2) la consultation des parties prenantes pour établir les priorités et réduire cette liste.

**Recommandation 11.** Les mesures transversales devraient être favorisées pour les utilisations de haute technologie et à faible volume.

**Recommandation 12.** Une approche verticale (descendante et hiérarchisée) devrait être privilégiée pour les technologies de faible à moyen niveau de technologie/avec des volumes élevés à moyens (utilisations en aval).

**Recommandation 13.** La stratégie publique doit être conçue comme une combinaison d'actions transversales et verticales (du haut vers le bas).

**Recommandation 14.** Pour chaque thème prioritaire, le choix des instruments dépendra de l'état de développement des technologies alternatives, de l'avantage concurrentiel perçu ou non par les acteurs et de la place des acteurs belges dans la chaîne logistique.

**Recommandation 15.** En règle générale, le soutien financier public ne devrait pas (et ne peut pas légalement) être accordé pour aider les retardataires à se conformer à la législation, ce afin de récompenser les pionniers.

**Recommandation 16.** La principale stratégie de soutien financier à la substitution consiste à clarifier les systèmes ascendants existants et à simplifier leur accès pour les parties prenantes concernées. Des actions financières spécifiques descendantes ne peuvent être envisagées que pour les thèmes prioritaires si l'approche ascendante s'avère insuffisante.

**Recommandation 17.** Soutenir à la fois la R&D individuelle privée et la R&D collaborative sans priorité financière. Un soutien financier spécifique de collaboration descendante ne peut être envisagé que pour les sujets prioritaires si l'approche ascendante s'avère insuffisante.

**Recommandation 18.** Les enjeux de la substitution devraient être communiqués aux organismes chargés de coordonner la politique publique de recherche, afin qu'ils puissent contribuer à la substitution.

**Recommandation 19.** Des instruments d'appui technique devraient être fournis et s'efforcer d'inclure les PME et les utilisateurs en aval qui en ont le plus besoin.

**Recommandation 20.** La Belgique devrait collaborer avec d'autres Etats membres sur des sujets qui ne présentent pas d'enjeu de compétitivité entre industriels (utilisations en aval, niveau technologique faible à moyen...).

**Recommandation 21.** Un esprit de complémentarité et de responsabilité partagée doit être introduit dans la feuille de route, établissant clairement les rôles de chaque partie.

**Recommandation 22.** L'établissement des priorités devrait être coordonné par le niveau fédéral car il peut centraliser les données provenant des régions, des autres Etats membres, de l'UE et de l'OCDE.

**Recommandation 23.** La création d'un réseau d'experts sur les substances prioritaires ou d'un groupe de substances serait utile pour l'évaluation des risques.

## Samenvatting voor beleidsmakers

### Samenvatting

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#### **Chemische stoffen en zeer zorgwekkende stoffen**

Tienduizenden chemicaliën zijn momenteel op de markt en jaarlijks komen er nog steeds nieuwe stoffen op de markt. Chemische producten vervullen veelzijdige en nuttige functies: ze helpen om voedsel langer te bewaren, het brandstofverbruik te verminderen, de levensduur van het product te verlengen, de mechanische eigenschappen of esthetiek van een materiaal te verbeteren, onze ziekten te genezen en symptomen te verminderen, ....

Hoewel veel chemicaliën onschadelijk zijn voor de menselijke gezondheid en het milieu, hebben sommige chemicaliën gevaarlijke eigenschappen. Enkele honderden stoffen worden zelfs als zeer zorgwekkend voor de menselijke gezondheid en het milieu (SVHC) beschouwd vanwege hun intrinsiek gevaarlijke eigenschappen (kankerverwekkende, reproductietoxische, mutagene en hormoonontregelende eigenschappen) en/of de combinatie van hun toxiciteit en persistentie in het milieu (PBT met inbegrip van POP-bestanddelen, vPvB), die dus van invloed zal zijn op toekomstige generaties.

Het werkelijke risico van SVHC's voor de gezondheid en het milieu hangt echter grotendeels af van het gebruik ervan en het scenario aan het eind van de levensduur, de waarschijnlijkheid van blootstelling en de betrokken persoon of personen of het betrokken milieu.

#### **Vervanging vanuit het oogpunt van de overheid: een noodzakelijk maar complex onderwerp**

In het algemeen belang moet vervanging plaatsvinden wanneer dit op duurzame wijze kan gebeuren, d.w.z. wanneer de alternatieve oplossing (verandering van stof of herontwerp van het product of proces) tegen redelijke maatschappelijke kosten wordt uitgevoerd, waarbij een afweging moet worden gemaakt van:

- de economische kosten van vervanging en andere potentiële maatschappelijke gevolgen van een verandering in de productprestaties;
- de verwachte voordelen voor de menselijke gezondheid, de toekomstige recyclebaarheid, ...

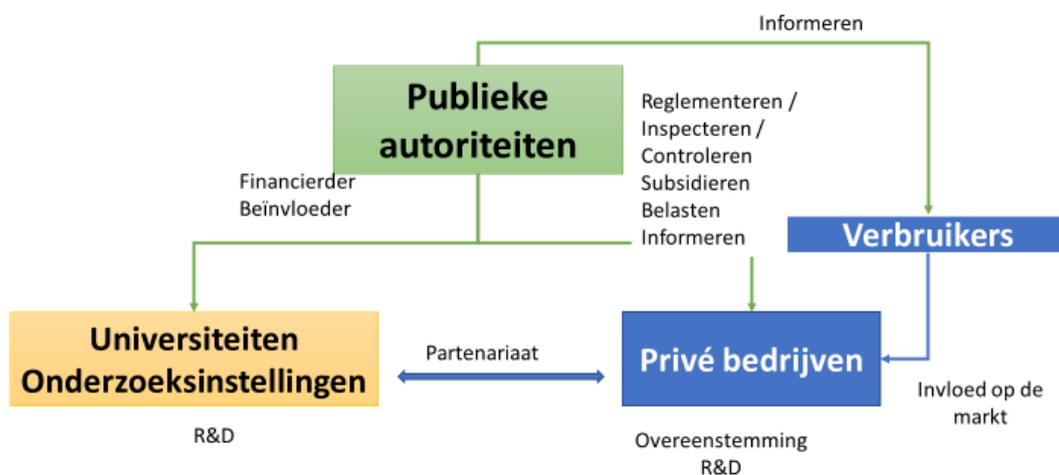
Duurzame vervanging wordt momenteel aangemoedigd door verschillende internationale, Europese en Belgische reglementeringen die het gebruik van de betrokken chemische stoffen beperken (Verdrag van Stockholm, Europese POP- en REACH-reglementering), de informatieverstrekking verplicht stellen en risicobeheersmaatregelen opleggen (CLP- en REACH-reglementering, milieuvergunningen, arbeidswetgeving, ...). Deze voorschriften alleen zijn echter om verschillende redenen niet voldoende:

- zij zorgen niet voor de bevordering van vervanging wanneer dit duurzaam is (analyse van alternatieven en sociaaleconomische beoordeling zijn niet voldoende holistisch, gegevens ontbreken en handhaving van de wetgeving, met name voor geïmporteerde producten, is niet voldoende);

- regelgevingsprocessen garanderen niet dat er voldoende middelen worden geïnvesteerd in onderzoek, het testen en implementeren van alternatieven om de kosten ervan te verlagen en ze winstgevend te maken. Innovatie, van fundamenteel onderzoek tot toegepast O&O, is een fundamentele pijler van vervanging;
- sommige belanghebbenden, en met name gebruikers van technologieën van laag tot middelhoog niveau (downstreamgebruikers, grote hoeveelheden, meestal veel soortgelijke toepassingen), zijn zich onvoldoende bewust van hun verplichtingen en kunnen nauwelijks met vervanging omgaan.

Daarom moet er een alternatieve overheidstrategie worden ontwikkeld. Het moet erop gericht zijn de instrumenten van het overheidsbeleid, zoals informatie, regelgeving en economische instrumenten, doeltreffend te combineren om de particuliere sector te helpen zijn wettelijke verantwoordelijkheden op doeltreffende wijze op zich te nemen.

**Figuur 7: Verdeling van de verantwoordelijkheden tussen overheden, particuliere bedrijven, onderzoeksinstituten en consumenten**



### **Substitutie vanuit het oogpunt van ondernemingen: een risico en/of een opportuniteit**

De vervanging van SVHC's door ongevaarlijke of minder gevaarlijke alternatieven is de verantwoordelijkheid van de industrie.

Eenzijds is vervanging dus een regelgevend risico voor de bedrijven, waarop zij moeten anticiperen om hun processen aan te passen en hun investeringen te plannen.

Aan de andere kant is vervanging een kans voor bedrijven om hun kosten (in verband met risicobeheersmaatregelen) te verlagen en zich te onderscheiden van de concurrentie. Bedrijven die

erin slagen om alternatieven te ontwikkelen voor de concurrentie een concurrentievoordeel krijgt, met name omdat consumenten, geïnformeerd door regelgevende processen en ngo's, de voorkeur geven aan producten die vrij zijn van zorgwekkende stoffen (bv. de vraag naar cosmetica zonder ftalaten en aluminiumzouten).

Indien substitutie een voldoende gedifferentieerde factor is om de kosten van O&O en individuele tests te rechtvaardigen, is het in het belang van de ondernemingen om alleen en sneller te innoveren dan hun concurrenten.

Zo niet, moeten bedrijven erin slagen om een spontane belangstelling voor samenwerking te vinden of moet het overheidsbeleid hen daartoe aanzetten.

### **Substitutie op het kruispunt van duurzame ontwikkeling en innovatie- en concurrentiebeleid**

Het 7e Milieuactieprogramma (7e MAP), dat in 2013 door het Europees Parlement en de Raad is aangenomen, geeft de Europese Commissie de opdracht om tegen 2018 "een EU-strategie te ontwikkelen voor een niet-giftig milieu dat bevorderlijk is voor innovatie en de ontwikkeling van duurzame alternatieven, waaronder niet-chemische oplossingen".

Ten eerste draagt vervanging bij aan het **volksgezondheidsbeleid** door het voorkomen van huidige en toekomstige risico's voor de gezondheid van consumenten en werknemers.

Ten tweede draagt vervanging bij tot de bescherming van de **ecosystemen en de biodiversiteit** (neonicotinoïden voor bijen, uitstoot van insecticiden in het water, enz.).

Ten slotte is vervanging een belangrijke doelstelling van het **actieplan voor de circulaire economie**. Door ervoor te zorgen dat stoffen die aanleiding geven tot bezorgdheid worden vermeden of aan de bron worden gereduceerd, zorgen we ervoor dat toekomstige generaties veilig en legaal materialen kunnen hergebruiken of recyclen, wat op zijn beurt bijdraagt aan een **efficiënt gebruik van hulpbronnen** en beperking van de **klimaatverandering**.

Aangezien vervanging een kans kan zijn voor bedrijven, moet het ook worden beschouwd als een **innovatie- en concurrentiebeleid**.

### **Een Belgische strategische routekaart naar vervanging**

De FOD Economie heeft RDC Environment en EPPA de opdracht gegeven om een openbare routekaart voor vervanging op te stellen. De methodologie omvatte documentair onderzoek, interviews met relevante Belgische belanghebbenden en andere lidstaten (Nederland, Duitsland, Frankrijk, Zweden) en een workshop met Belgische belanghebbenden.

De conclusie van de studie luidt dat er een alternatieve overheidsstrategie nodig is als aanvulling op de bestaande regelgevingsinstrumenten, die, zoals we al hebben aangegeven, meerdere lacunes vertonen.

De Europese vervangingsstrategie, gecoördineerd door ECHA, zal niet voldoende of adequaat zijn om de Belgische uitdagingen aan te gaan, zowel vanuit een risico-, industrieel, demografisch of prioritair overheidsbeleids perspectief. Daarom moet een Belgische strategie worden ontwikkeld.

De belangrijkste bijdrage van deze studie was om aan te tonen dat, om effectief te zijn, de strategie moet worden georganiseerd als:

- een combinatie van informatie, regelgevende en economische instrumenten;
- een combinatie van multisectoriële en niet-specifieke (transversale) acties en acties op maat gericht op prioritaire thema's specifiek voor België (verticaal).

Verticaal overheidsoptreden is alleen relevant voor 1) onderwerpen die relevant zijn voor België 2) waar het waarschijnlijk resultaten zal opleveren. De studie hielp om de typologie van de gevallen waarin verticale actie vereist is, te belichten:

- Wanneer stoffen die aanleiding geven tot bezorgdheid in België worden gebruikt in laagtechnologische toepassingen (bv. verchromen) op middelzwaar technologisch niveau (bv. verven) of door downstreamgebruikers (bv. meubelen), omdat:
  - gebruikers van stoffen (met name stoffen in voorwerpen) doorgaans niet het niveau van verfijning hebben dat nodig is om de bestaande vervangingsmogelijkheden te bepalen en zeker in moeilijkheden zouden verkeren om deze als trial-and-error in hun productieketen toe te passen;
  - substitutie in het algemeen geen concurrentievoordeel biedt in deze gevallen, wat betekent dat investeringen in O&O niet spontaan zijn en dat de samenwerking tussen gebruikers en producenten van stoffen moet worden aangemoedigd;
  - zelfs als er erkende mogelijkheden voor gedeeltelijke vervanging zijn, deze moeilijk uitvoerbaar zijn door een gebrek aan kennis, kosten van dubbele productielijnen, gebrek aan erkende duurzaamheid, enz.

Samengevat gaat het hier om toepassingen waarbij het vermogen tot spontane vervangingsinnovatie wordt beperkt.

- Wanneer stoffen die aanleiding geven tot bezorgdheid kunnen worden vervangen door in België geproduceerde alternatieven, die daarom moeten worden ondersteund;
- Wanneer er in het Belgische milieu zorgwekkende stoffen in een zorgwekkende concentratie worden aangetroffen.

Integendeel, zijn gerichte overheidsmaatregelen niet relevant wanneer stoffen in België een hoogtechnologische functie vervullen (bv. een oplosmiddel dat in een bepaald farmaceutisch proces wordt gebruikt), omdat:

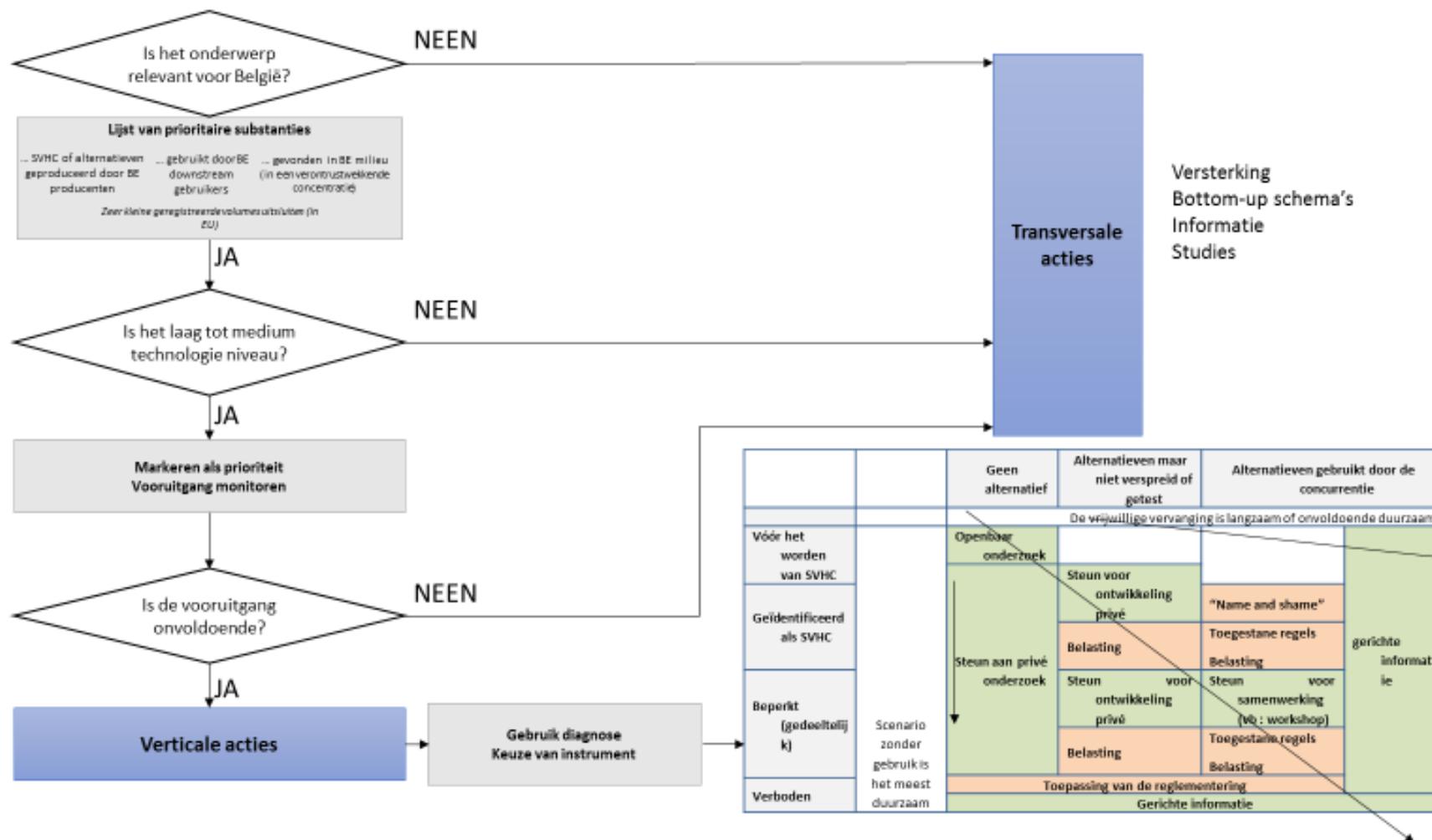
- de industrie vervanging over het algemeen ziet als een bestaande mogelijkheid met een concurrentievoordeel. Zij voeren hun eigen onderzoek uit, waarbij het voor overheden moeilijk is om te helpen of uit te dagen vanwege het technologische niveau van producten en processen;
- het risico laag is omdat de stoffen gewoonlijk in kleine hoeveelheden worden gebruikt, in een gesloten en/of gecontroleerde omgeving waar de veiligheidsprestaties boven het gemiddelde liggen en adequate risicobeheersmaatregelen zijn getroffen;
- elke actie van de overheid specifiek zou zijn, moeilijk te reproduceren en dus onrendabel.

Transversale acties zijn in dat geval geschikter. Zij omvatten een versterking van de beschikbare kennis en informatie, verduidelijking van de relevante bottom-upsystemen voor financiële ondersteuning en een betere handhaving.

Op basis van alle in deze studie voorgestelde criteria moet ten eerste een lijst van prioritaire thema's voor overheidsoptreden en -innovatie worden opgesteld, ingedeeld naar functie (oplosmiddelen, brandveiligheid, weekmakers, enz.). Er zijn gegevensbronnen geïdentificeerd en geëvalueerd die als basis kunnen dienen voor de keuze van deze prioritaire onderwerpen.

Ten tweede zou een diagnose moeten bijdragen tot preciezere informatie over de rol van de Belgische actoren in de bevoorradingsketen en zou de lijst van prioriteiten kunnen worden verfijnd. De inspanningen op het gebied van substitutie en de vooruitgang op prioritaire thema's moeten regelmatig worden gemonitord om te beslissen waar en hoe het beste kan worden opgetreden.

Figuur 8: Belgische routekaart voor vervanging - Samenvatting



De keuze van de beleidsinstrumenten moet worden aangepast aan elk prioritair thema, waarbij met name rekening moet worden gehouden met de regelgevende status van SVHC's op EU-niveau (onder toezicht, beperkt of verboden) en het ontwikkelingsniveau van SVHC's (niet-geïdentificeerd, geïdentificeerd maar niet getest, gebruikt voor andere toepassingen, met succes gebruikt door concurrenten). Er mag met name geen financiële steun worden verleend aan achterblijvers en zodra een stof verboden is. Voor achterblijvers moeten andere soorten instrumenten worden overwogen, zoals informatie en technische ondersteuning, strengere vergunningsregels, belastingheffing of naam en faam.

**Figuur 9: Verticale actie - keuze van beleidsinstrumenten**

		Geen alternatief	Alternatieven maar niet verspreid of getest	Alternatieven gebruikt door de concurrentie
		De vrijwillige vervanging is langzaam of onvoldoende duurzaam		
Voor het worden van SVHC	Scenario zonder gebruik is het meest duurzaam ↓	Openbaar onderzoek		
Geïdentificeerd als SVHC		Steun aan privé onderzoek	Steun voor ontwikkeling privé	"Name and shame"
Beperkt (gedeeltelijk)			Belasting	Toegestane regels Belasting
			Steun voor ontwikkeling privé	Steun voor samenwerking voor (vb : workshop)
Verboden			Belasting	Toegestane regels Belasting
	Toepassing van de reglementering			Gerichte informatie
		Gerichte informatie		

Typisch traject

Zowel voor het bepalen van de prioriteiten als voor het nemen van maatregelen is samenwerking tussen het gewestelijke en het federale niveau noodzakelijk, aangezien vervanging een complexe kwestie is die gedeelde bevoegdheden en informatie (in België) tussen het federale en het gewestelijke niveau vereist.

De leden van het Belgische REACH-comité beschikken over de meeste vaardigheden die nodig zijn voor de uitvoering van deze routekaart (overheidsbeleid, toxicologie, enz.). De vaardigheden op het vlak van communicatie- en innovatiebeleid moeten echter worden ontwikkeld, wat kan worden bereikt door rekrutering, opleiding of actieve samenwerking met andere regionale en federale teams die momenteel geen deel uitmaken van het REACH-samenwerkingsakkoord (afdelingen innovatiebeleid, economische afdelingen, andere afdelingen voor duurzaamheid, communicatie, ...).

## Lijst van aanbevelingen

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**Aanbeveling 1.** Vervanging moet alleen worden aangemoedigd als deze duurzaam is.

**Aanbeveling 2.** Om betreuenswaardige vervanging te voorkomen, moet de prioriteitstelling niet worden georganiseerd rond afzonderlijke stoffen, maar rond belangrijke functies of sectoren.

Functionele vervanging (herformulering, wijziging van producten of processen) verdient de voorkeur boven directe vervanging (vervanging van een stof door een andere) omdat directe vervanging vaak leidt tot betreuenswaardige vervanging (vervanging van een stof door een stof die nog niet gereguleerd is, maar die ook - of meer - gevaarlijk is).

**Aanbeveling 3.** België moet in zijn vervangingsstrategie alle stoffen die van belang zijn voor de gezondheid van de mens en het milieu en alle relevante eindeffecten aanvaarden en de routekaart niet beperken tot zeer zorgwekkende stoffen die volgens de REACH-verordening als prioritair zijn geklasseerd. Er moeten prioriteiten worden gesteld voor SVHC's en worden aangevuld met andere relevante stoffen.

**Aanbeveling 4.** Vervanging, vermindering van gevaarlijke stoffen en risicobeheer moeten worden beschouwd als een hiërarchie, in overeenstemming met het principe van "vermijden, vermindering en compensatie", dat de drijvende kracht is achter de strategieën voor de bescherming van de biodiversiteit in Europa.

**Aanbeveling 5.** België moet vervanging beschouwen als een uitdaging op lange termijn.

Als onmiddellijke vervanging niet mogelijk is, moet de kennis over het gebruik van de stof worden verbeterd en moet de kwestie van erfelijke stoffen (of restanten) worden gemonitord, bijvoorbeeld door het gebruik van SVHC in gereguleerde circuits (of de levenscyclus) te bevorderen.

**Aanbeveling 6.** Er moet een openbare strategie ter ondersteuning van vervanging worden ingevoerd.

**Aanbeveling 7:** Bewustmaking op politiek niveau is nodig om de nodige middelen en steun voor de alternatieve strategie te verschaffen.

**Aanbeveling 8.** In België zal het van essentieel belang zijn om de overheidsacties te concentreren op prioritaire thema's in termen van duurzaamheid en relevantie voor België.

**Aanbeveling 9.** Op nationaal niveau worden prioriteiten gesteld om de informatie te centraliseren en de uitvoering te vergemakkelijken. De prioriteitstelling moet worden gecoördineerd door het federale niveau, met de actieve inbreng en validatie van de andere partijen.

**Aanbeveling 10.** De Belgische aanpak van de prioriteitenstelling moet een combinatie zijn van (1) de herziening van de bestaande gegevensbronnen om de eerste lijsten met belangrijke thema's op te stellen en (2) overleg met de belanghebbenden om prioriteiten vast te stellen en deze lijst te beperken.

**Aanbeveling 11.** Horizontale maatregelen voor hightechnoepassingen en kleinschalige toepassingen moeten worden bevorderd.

**Aanbeveling 12.** Een verticale benadering (top-down en hiërarchisch) verdient de voorkeur voor technologieën met een laag tot gemiddeld technologisch niveau / met hoge tot gemiddelde volumes (downstreamgebruik).

**Aanbeveling 13.** De publieke strategie moet worden opgevat als een combinatie van transversale en verticale (top-down)acties.

**Aanbeveling 14.** Voor elk prioritair thema zal de keuze van de instrumenten afhangen van de stand van de ontwikkeling van alternatieve technologieën, het concurrentievoordeel dat de actoren al dan niet ervaren en de plaats van de Belgische actoren in de toeleveringsketen.

**Aanbeveling 15:** In de regel mag (en kan) geen financiële overheidssteun worden verleend om achterblijvers te helpen zich aan de wetgeving te houden, dit om pioniers te belonen.

**Aanbeveling 16.** De belangrijkste strategie voor financiële steun voor vervanging is het verduidelijken van de bestaande bottom-upsystemen en het vereenvoudigen van de toegang tot deze systemen voor de relevante belanghebbenden. Specifieke financiële acties van bovenaf kunnen alleen voor prioritaire thema's in aanmerking worden genomen als de aanpak passend is.

**Aanbeveling 17.** Ondersteuning van zowel individuele particuliere als gezamenlijke O&O zonder financiële prioriteit. Specifieke financiële steun voor top-downsamenwerking kan alleen worden overwogen voor prioritaire thema's als de bottom-upbenadering onvoldoende is.

**Aanbeveling 18.** De kwesties in verband met vervanging moeten worden meegedeeld aan de organen die verantwoordelijk zijn voor de coördinatie van het openbare onderzoeksbeleid, zodat zij kunnen bijdragen tot de vervanging.

**Aanbeveling 19.** Er moet worden voorzien in instrumenten voor technische ondersteuning en ernaar worden gestreefd kmo's en downstreamgebruikers, die deze het meest nodig hebben, erbij te betrekken.

**Aanbeveling 20.** België moet met andere lidstaten samenwerken op gebieden die geen uitdaging vormen voor het concurrentievermogen van de industriële (downstreamtoepassingen, laag tot middelmatig technologisch niveau, enz.).

**Aanbeveling 21.** In de routekaart moet een geest van complementariteit en gedeelde verantwoordelijkheid worden opgenomen, waarbij de rol van elke partij duidelijk moet worden vastgesteld.

**Aanbeveling 22.** De prioriteitstelling moet worden gecoördineerd door het federale niveau, aangezien het de gegevens van de regio's, andere lidstaten, de EU en de OESO kan centraliseren.

**Aanbeveling 23.** De oprichting van een netwerk van deskundigen op het gebied van prioritair stoffen of een groep van stoffen zou nuttig zijn voor de risicobeoordeling.

### Naam en toenaam - Openbaar aanklagen

Titel	Naam en toenaam - Openbaar aanklagen
Omschrijving	<p>Wanneer er beschikbare, duurzame en niet-uitgevoerde alternatieven zijn, kunnen overheden de "name and shame"- of openbare aanklachtstrategie gebruiken om bedrijven aan te moedigen om te vervangen. Er moet een openbare communicatiestrategie worden ontwikkeld om de boodschap op grote schaal te verspreiden, zodat de particuliere besluitvorming wordt beïnvloed.</p> <p>Een alternatief voor een duidelijke klokkenluidersstrategie zou kunnen zijn om de vooruitgang op het gebied van belangrijke innovatiethema's (actie H) te volgen en deze op transparante wijze te publiceren, en om regelmatig (ongeveer om de twee jaar) een persconferentie te houden om pioniers onder de aandacht te brengen en achterblijvers te identificeren</p>
Coördinatie	FOD Economie

### Overheidsopdrachten en belastingen

De instrumenten op het gebied van belastingen en overheidsopdrachten moeten eerst worden beoordeeld in het kader van substitutie (actie C) alvorens te worden uitgevoerd. Zie **Fout!**

**Verwijzingsbron niet gevonden..**

## I. Objectives and methodology

FPS Economy has commissioned RDC Environment and EPPA to define a **strategic roadmap to support substitution of substances of very high concern (SVHC)**.

SVHC (Substances of Very High Concern) are chemical substances that fall into one of the following categories:

- Carcinogenic, mutagenic or toxic to reproduction substances (CMR category 1 or 2)
- Persistent, bioaccumulative and toxic substances (PBTs)
- Very persistent and bioaccumulative substances (vPvB)
- Substances that can disrupt the endocrine system

The SVHC list corresponds to the candidate substances in Annex XIV of the REACH Regulation, which are subject to authorisation.

The main objective of such a list is to reduce the use and encourage the substitution of SVHCs contained in articles at a concentration above 0.1%.

RDC Environment and EPPA conducted the study around the following objectives:

- Identify the adequate public policy instruments to support chemical substitution in Belgium;
- recommend a governance scheme to organise substitution in Belgium that addresses coordination of the federal and regional services involved in the cooperation agreement;
- Identify opportunities for public authorities to leverage or foster collaboration or cooperation when possible and relevant (between private actors, between levels of competence, between Member States);
- develop a methodology to prioritise substances, uses and sectors that require specific public support for substitution (top-down approach), and identify relevant and suitable data sources that should inform the prioritisation process.

The strategy shall be applicable to current SVHCs as well as to substances that will be so classified in the future.

It is important to note that implementing the recommended prioritisation methodology to identify priorities is outside the purview of this project.

The project methodology included:

- Literature research to identify key attention points for the strategy.
- Interviews with Belgian stakeholders (public authorities at federal and regional level, industry, clusters) to understand competencies, collaboration mechanisms, strategies and data sources necessary to inform the roadmap.

- Interviews with public authorities of other Member States (the Netherlands, Germany, France, Sweden) in order to compile and assess their good practices.
- A workshop with Belgian stakeholders to test a draft strategy for substitution.
- Desk work to compile these different elements together and develop recommendations.

## II. Diagnosis and guiding principles

### II.1. Conclusions: diagnosis

#### II.1.1. SUBSTANCES LARGELY DIFFER IN VOLUMES AND USE TYPOLOGY

Taking a step back and looking at the current substances on Annex XIV, XVII of REACH, and on the candidate list or substances of very high concern in general, it is evident that substances of very high concern differ greatly in volumes produced and use categories. This is reflected in the number of authorisation dossiers submitted (applications for authorisation).

- Substances that are no longer used

Example: Although Musk Xylene was the first substance added to the Candidate List and it is highly visible amongst stakeholders, it did not generate a single authorisation request because it had been phased out before it was ever added to the candidate list.

- Substances with a dozen applications for authorisation

Example: Trichloroethylene – yielded a dozen applications for authorisation for varied uses – some very technical, some bridging applications and a few broader scope ones. There was very little coherence among the uses and substitution was unfeasible in the absence of substantial material science research and development (long term endeavour);

- Substances with 10-100 applications for authorisation

Example: OPE/NPE (octylphenol/nonylphenol ethoxylates) – the applications will be forthcoming but there will be many. Whilst similar they are all applied in small volumes, highly controlled high-tech environments fulfilling technical functions that are usually subject of regulatory controls on performance.

- Substances with 100-1000 applications for authorisation

Example: Chromium Trioxide – yielded many (pending) applications which covered hundreds if not thousands of downstream uses with a reasonable degree of coherence. Substitution was generally partially possible but not generically;

From the above list it is evident that some substances are not a priority because they are not being used (e.g., musk xylene), while for others there is little to be gained by applying undue pressure because the difficulties facing the users are linked to future developments in material science, that usually takes a long time (e.g., trichloroethylene).

## II.1.2. THE ROLE OF TECHNOLOGICAL SAVVY AMONGST STAKEHOLDERS.

### II.1.2.1. Characterisation of substances according to technology level

The hazard characteristics, production volumes and uses frequently play key roles in discriminating in favour of action on one or another substance but other characteristics are also relevant.

It is important to understand the sentiments of industry regarding regulation of chemicals/substances they use in manufacturing. Consulted Belgian stakeholders in the industrial sector contend that public authorities should refrain from supporting actions designed to substitute substances that are already subject to existing Europe regulation.

The reason for this reaction is simple – the stakeholders contacted represent sophisticated industries that can understand and react to regulatory developments. This is evidenced by the very fact they are sufficiently organised to communicate their wishes through the trade associations. Furthermore, these industries are more likely to be aware of substitution opportunities than their public-sector counterparts since many are committed to robust sustainability programs that reward and drive substitution.

However, there are, other stakeholders with lower levels of sophistication.

Analysis of authorisation applications suggests the following segregation:

- **High technology** uses generally consume low volumes (a few tonnes at the very outside, generally far less) and require little specific support
  - In high technology production, the process control is high which reduces potential exposure; therefore sanitary/environmental risks tend to be low regardless of the substance used.
  - Safety performance is above average in this case;
  - Due to the specificity of the substance use, substance-specific in-house expertise is high compared to that of external groups.
- **Medium technology** – consume mid to higher volumes – with many identical or analogous uses:
  - Generally, these are grouped applications where the producer plays a key role in catalysing the process;
  - The downstream users tend to lack the sophistication required to ascertain what substitution possibilities exist; certainly, they would be challenged to introduce them into their production chain on a trial-and-error basis;
  - There are recognised possibilities for partial substitution, but these are difficult to implement for several reasons, including to lack of knowledge, cost of running dual production lines, and lack of recognised durability information....
- **Lower technology** applications consuming higher volumes
  - The downstream users lack the technical sophistication to substitute without technical help from the manufacturer;
  - The manufacturer is (generally) non-Belgian.

In addition to the intrinsic hazard characteristics of substance use, investment of time and resources should be prioritised to target substances that have a practical application in Belgium or for which domestic uses pose significant human and environmental risk in Belgium.

Government action should reflect the specificities of the Belgian industrial landscape and the logic of its operators.

Belgium is blessed with several high-tech industries, notably in biotechnology and semi-conductors. It also has a broad industrial base of family/medium-sized industrial companies in the same vein as Germany whereas it is quite different from e.g. Sweden or Netherlands.

In Germany TÜV was a 19<sup>th</sup> century creation of beer brewers who were confronted with occupational safety issues related to high pressure vessels. Considerable number of deaths occurred leading to a joint action to develop a solution that individual brewers were unable to do on their own.

The spirit of collaboration between competitors, which can be relevant to innovate in the field of chemical substitution, is very common in Germany and Austrian industrial circles but less so in Belgium.

#### II.1.2.2. Recommended approach according to technology level

##### Substance of low to medium technological level: top-down support

Our experience shows that the delay to develop and test substitution alternatives is greater for substances used in low to medium technological applications. Usually, these substances are used by different supply chains that do not communicate, with each company using the substance in relatively small quantities and with low added value.

Public support is most needed at this level because:

- R&D resources are diluted among many companies and come at a disproportionate cost compared with the substance added value, especially for SMEs;
- Innovation on low or medium technological level applications presents little competitive advantage and companies are likely to be open to collaboration.

Support is needed in 3 areas:

- Technical support to understand substitution and networking
- R&D to find alternatives
- Development support to test the performance of potential alternative chemicals or technological solutions against customer needs (e.g., recertifications). This particularly true for durable products, because longevity and life-cycle performance tests are expensive.

Technical and financial support at this level is especially important for SMEs, most of whom have neither financial capacity nor expertise to engage in company-level R&D to find and tests alternatives.

In these cases, information does not circulate well. Public authorities could play a significant role to emphasise the importance of substitution, to facilitate networking and collaborative projects and to share information.

**Substances contributing to advanced technology: bottom-up support is enough**

On the other hand, our experience suggests that substances which are highly linked to advanced technology get less added value from a top-down public support for the following reasons.

- First, because process control is usually high and safety performance is above average in these sectors, risks tend to be low regardless of the substance;
- Second, because most solutions will be unique and specific to each industrial, it would be impractical and difficult to rely on focused outside support to craft substitution solutions;
- Third, industry is generally willing to invest in R&D to gain competitive edge.

Two examples illustrate this situation:

- Trichloroethylene (TCE). Trichloroethylene is used notably by the company Roquette as a processing aid in biotransformation of starch to obtain betacyclodextrin<sup>3</sup>, which is used in consumer, pharmaceutical and food applications. The use of TCE has been demonstrated as indispensable to increase the enzymatic reaction yield. Despite numerous tests, no other solvent could meet the following critical functions: compatibility with the enzymatic reaction, must ensure efficiency of the process, non-flammable, easily recovered for re-use and compliant with rules on solvent residues for food or pharmaceutical products. No alternative can be identified in the absence of advances in material science (therefore long-term);
- OPE/NPE (octylphenol/nonylphenol ethoxylates). These compounds decompose in endocrine disruptors (octylphenol) when released in the environment. Applications for authorisation will be forthcoming but there will be many. Whilst the uses will be similar, these chemicals are applied in small volumes, in highly controlled high-tech environments which fulfil technical functions that are usually subject to regulatory controls on performance.

Public support is obviously welcome for any company in these cases, and private R&D and existing bottom-up financial support schemes to support innovation are already well suited.

### II.1.3. THE CASE FOR A SUBSTITUTION ROADMAP

**Conclusion 1. Current regulatory processes (notably restriction and authorization) contribute to push substitution but they need improvement to properly fulfil their role. These regulations rely on analysis of alternatives and socio-economic assessments which are currently biased.**

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<sup>3</sup> An important conclusion of the recent review of REACH by the European Commission (march 2018) is that having substances on the candidate list or flagged as priority substances for restriction drives corporations to pursue research for alternatives to avoid the anticipated regulatory and supply chain pressure of REACH designation.-

Data source: European Commission - march 2018- Commission General Report on the operation of REACH and review of certain elements

*This conclusion is connected to Recommendation 1.*

The combination of SVHC identification, authorisation and restriction processes foreseen by REACH Regulation n°1907/2006 increases the cost of using SVHC and thus encourages their substitution<sup>4</sup>. Other instruments also contribute to encourage substitution, such as the classification of hazardous substances and mixtures (CLP Regulation) and the influence of hazardous substances on permitting regimes.

Exemptions or delays from regulatory restrictions can be requested if the societal cost of substitution exceeds the expected benefit (based on an Analysis of Alternatives (AoA) and a Socio-Economic Assessment (SEA)).

Bias arises because methodologies which support decision-making (AoA and SEA) are not holistic enough and because data are missing or not shared adequately within industry. This tends to weaken the case for substitution.

Applicants often do not consider functional alternatives (redesign of process or product) and alternatives with lower consumer appeal or which impart significant reduced functionality (i.e., intermediate scenarios between no use and continued use). On the contrary, drop-in substitution is usually emphasized.

Additionally, the socio-economic impacts of substitution on other sustainability issues (circular economy, climate change) tend to be disregarded.

Finally, there is insufficient quality data available regarding existing alternatives. Consequently, applicants for authorisation or exemption from restriction, or the competent authority filing a restriction dossier, have difficulties identifying alternatives when they do exist. This reduces the level of information available to conclude whether substitution is feasible and sustainable, thereby reducing the potential for substitution when it may in fact be achievable.

Key challenges for substitution are discussed further in Appendix VIII.

**Conclusion 2. The mission of public authorities in charge of REACH is compliance, with a focus on the EU agenda. Substitution needs to be supported by a combination of regulatory and economic instruments, including innovation policy. However, coordination, information and capacities (resources and competencies) need to improve to reach this vision.**

Substitution of hazardous substances is both a risk and an opportunity for businesses that must be addressed via combination of compliance and innovation.

- Eliminating the use of substances of concern through substitution or alternative processes is the obligation for the industry, as reflected in many European legislations (REACH, Waste Framework Directive, Industrial Emissions Directive).
- Substitution is also an opportunity for businesses to gain competitive edge and increase market share. Firstly, it addresses customer demand for non-toxic products. Secondly, an

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SVHC is likely to be restricted once a safe alternative is found and available and used, negatively affecting competitors still using it.

Because substitution of hazardous substances is both a risk and an opportunity to business, it needs to be supported by a combination of regulatory and economic instruments, including innovation policy.

Currently, substitution is not explicitly tackled by public authorities in charge of REACH, although all authorities continue to highlight its importance. The teams in charge of compliance with REACH and of innovation policy hardly interact with each other, although an efficient substitution policy requires it. Teams in charge of compliance within the administration have a scientific and technical background, but they rarely communicate with the industry beyond ongoing dossiers and helpdesk activities. Other teams within the competent authorities and beyond (clusters) have the necessary skills and experience in innovation policy and communication with the industry, but they lack the in-depth awareness of the inherent technical and market challenges involved with substitution.

### **Conclusion 3. A public strategy to support substitution is needed.**

On the one hand, the administration (both federal and regional levels) is in favour of a dedicated policy to support substitution. This policy should fill in existing gaps (e.g. more technical support and incentive for low to medium technology levels / downstream users, improved methodologies...) and complement the European substitution strategy advanced by ECHA.

On the other hand, the representatives of Belgian industry have shown clear reluctance to consider a Belgian roadmap to substitution of SVHC, suggesting that the current policy is generally adequate and that it should undergo only minor revisions designed to address specific gaps in the support schemes. Our analysis suggests that this position is influenced by the specific nature of the trade associations consulted, who represent chemical and high-tech companies (usually frontrunners in substitution) and not downstream users. These trade associations may feel less need for specific support to chemical substitution. In addition, we also sense their general reluctance to enable public authorities to become more involved in innovation policy and some concern that public authorities would stress substitution without considering the risk of regrettable substitution and unique challenges pertaining to each substitution case (holistic view of substitution previously discussed).

In conclusion, we disagree with the implied statement that the industry overall does not need support (whether it is technical, financial or regulatory) to substitute substances of very high concern. Our research has shown the current policy context (regulatory and economic instruments) does not ensure that substitution is achieved whenever it is sustainable, which should be the objective of the current roadmap.

Benchmarking has also shown that other Member State have implemented an assortment of public policy actions to incentivise substitution. We can name a few notable initiatives:

- The French CMR Substitution strategy contributes to substitution of CMR in the workplace by requiring that employers demonstrate continuous improvement and attempts to substitute;

- The Swedish substitution centre (launched beginning 2019) proposes to address the identified needs of downstream users by providing information and technical support regarding substitution;
- The Dutch Safe Chemicals Innovation Agenda highlights priority themes for innovation in the field of substitution so that the Dutch authorities can help advance these issues, monitor progress made in R&D and incorporate the relevant considerations into public policy development.
- The Dutch ZZS list highlights key substances whose emissions must be avoided or reduced. Installations subject to an environmental permit must prove they avoid or reduce emissions of substances on the ZZS list and report continuous improvement, including substitution of hazardous chemicals or R&D on the subject. ZZS substances can still be used if emissions are controlled, and discharge limit values are specified in environmental permits.

Chapter V elaborates on the approach developed by a selection of 4 Member States.

**Conclusion 4. Public authorities currently prioritise their action based on existing expertise (substance evaluation, choice of workshop subjects...) or bottom-up requests (helpdesk, subsidies). A structured substitution strategy can address the specifics of the Belgian situation whether from a risk, industrial, demographic or policy priority perspective.**

*This conclusion is connected to Recommendation 9.*

Simply put, not all substances in the process of regulatory action are relevant for Belgium. Hence setting priorities through a development of a strategy seems appropriate.

#### II.1.4. WHAT TYPE OF PUBLIC SUPPORT?

**Conclusion 5. Bottom-up schemes already provide enough resources, have strong visibility and give adequate flexibility to researchers and companies to innovate as they deem appropriate.**

The regional and bottom-up approach to support schemes is appreciated by all stakeholders.

However, financial support schemes for substitution are currently a low priority. Regional support schemes have limited awareness of substitution. Chemical clusters see it as part of their strategic programmes (e.g., the Renewable Chemistry programme of Catalisti), but substitution is not particularly stressed or promoted.

**Conclusion 6. When the opportunity of a collaboration is identified, collaboration is already encouraged by the *de minimis* rules (more financial support can be achieved when industrials come together) and by clusters. There is no need to encourage more collaboration.**

A collaborative approach is not appropriate for projects where gaining competitive edge is relevant, and collaboration may even be counterproductive in these instances (less productive resources being devoted to collaborative R&D).

**Conclusion 7. The lack of financial support for substance registration is perceived as a bottleneck by the industry to place alternatives on the market.**

The reality of substance registration being a bottleneck could not be verified as part of this study.

**Conclusion 8. Existing communication initiatives borne by public authorities (newsletter) have low visibility.**

#### II.1.5. AT WHICH SCALE?

**Conclusion 9. The European strategy for substitution, coordinated by ECHA, will be insufficient and inadequate to address specific Belgian challenges.**

The European strategy for substitution, coordinated by ECHA, aims at coordinating actions that are conducted at Member State level, value good practices and contribute to networking. However, the European strategy will neither affect or review existing support schemes at MS level, nor target Belgian specificities.

**Conclusion 10. Substitution is a complex issue that requires using different types of policy instruments, which in Belgium are shared competencies between the federal and the regional level:**

- Regulatory instruments are suitable to force the industry to substitute when alternatives are available, to stop production / import if the “no use scenario” is more sustainable than a continued use; or in the meantime, to reduce substance use and to apply risk management measures. Regulatory competencies are distributed as follows:
  - restrictions to substance marketing are a federal competency
  - permitting and inspections, which set necessary risk management measures or restrictions that can lead to stop the production, are a shared competency between regions, the federal service for employment and the federal service for public health.
- Economic instruments (taxation, support schemes, public procurement rules can incentivise industry to substitute or innovate in this direction.
  - Taxation of products is a federal competency;
  - Public procurement is both a regional and federal competency;
  - Support schemes are a regional competency (except for Airbus projects).

**Conclusion 11. Setting priority subjects for substitution requires a set of skills, information and experience that is spread among the federal and regional levels (technics, ecotoxicology, toxicology, socio-economic, support to innovation).**

- FPS Economy has a better knowledge of the market and of companies;
- FPS Health has a team of toxicologists and ecotoxicologists and a broad knowledge of hazards and risks;

- The federal level is in contact with ECHA and other Member States and can thus share experiences. Knowing which projects are conducted by other MS or organisations is key to avoiding redundancy in research projects and encouraging networking.;
- Regions monitor substances that are found in the environment. Regional information on substances of concern for the environment in Belgium could help fill in the recognised gaps in the assessment of ecotoxicity in restriction dossiers and thus contribute to prioritisation.
- Regional competent authorities collect partial information about substance use via permitting and inspections (information on substance use but no information on substances present in imported articles), and occasional and partial information about the use of alternatives. Currently, they do not adequately share this information with partners to the REACH cooperation agreement due to lack of resources and time during REACH committee meetings, and because they are unaware of the benefits of sharing this information (officers having information are not in charge of REACH as such).
- Regions are (or could be) aware of substitution projects that are financed via regional support schemes.

**Conclusion 12. Changing the repartition of competencies in Belgium to support substitution is not recommended.**

As highlighted in the previous conclusion, competencies that are relevant to this strategy are distributed between many different levels of government. We do not recommend redistributing these competencies because:

- It is unrealistic to aggregate all competencies in one organisation due to the diversity of competencies required: health, economy, innovation... Benchmarked Member States, even those with centralised competencies, have also organised their substitution strategy based on collaborations among different agencies / authorities.
- Redistribution of competencies from the regional to the federal level with the goal of centralising the approach is not supported by the stakeholders consulted. On the contrary, the current distribution of competencies (and notably the regional approach to support innovation) is supported by all;
- Collaboration among the different levels within the existing cooperation agreements appears to be functioning well. Views are generally aligned between the different services of the Federal Public Service and regional authorities. Parties to the cooperation agreement succeed in reaching an agreement on a Belgian official position, which suggest that a collaboration would be efficient.

Substitution would require extending collaboration to other departments in charge of innovation.

## II.1.6. DEVELOPMENT OF INFORMATION AND EXPERTISE

**Conclusion 13. Expertise of REACH competent authorities currently covers only a limited number of substances and alternatives and cannot reasonably be expected to cover all substances and alternatives.**

Public authorities (in all MS) have developed different expertise based on the specific substances they have evaluated and on the related challenges that were encountered. Considering the large number of registered substances (> 20 000 in March 2019), Belgium cannot develop a detailed expertise for each substance or chemical group used in Belgium, nor for all relevant aspects of substitution (toxicology, alternatives, technical use, etc.), unless more resources (financial or human) are provided.

**Conclusion 14. Information available to public authorities relevant to substitution and prioritisation (e.g., use of SVHC, use of alternatives) is not readily available for sharing (e.g., not digitized for electronic distribution).**

A significant volume of information available to regional public authorities is not digitalised, and therefore not easily shared (not exportable in a directly usable format).

Currently, this information does not circulate well due to lack of resources, lack of awareness that this information could be useful to other officers and time constraint during Belgian committee meetings.

## II.2. Recommendations: guiding principles

### II.2.1. A HOLISTIC AND SUSTAINABLE APPROACH TO SUBSTITUTION

**Recommendation 1. Substitution should be encouraged whenever, and only if, it is sustainable.**

*This recommendation is connected to Conclusion 1.*

1. Only if sustainable: the roadmap should not blindly encourage substitution when it can lead to regrettable substitution. Regrettable substitution means that substitution impose similar or greater risks to human health and the environment or negatively affect other elements of the sustainability continuum, including circularity and climate change. Therefore, all relevant (i.e., all significant) impacts of substitution should be included in socio-economic assessments.
2. If sustainable: the analysis of alternatives ensure that all relevant alternatives are considered, including alternatives that result in a loss of functionality or a no-use scenario.

We see a strong consensus between the administration (federal and regional) and the industry to support this guiding principle, although the “only if” orientation is the sole orientation raised by the industry. Making sure that substitution is sustainable would answer some of the concerns raised by industry when arguing about the relevance and ambition of the strategy. This approach could increase stakeholder acceptance for the roadmap.

Therefore, we propose to introduce sustainable substitution as a guiding principle within the roadmap, supported with a set of actions to ensure it is applied in practice. Moreover, we view technical and economic feasibility of substitution not as additional concepts, but components of a sustainability assessment. If substitution is technically unfeasible, this can be taken into account by assessing the effects of a no-use scenario on the economy, the society and the environment; economic unfeasibility, it can be taken into account by assessing the effect of a lower available revenue for users, or of a reduced use.

**Recommendation 2. In order to avoid regrettable substitution, prioritisation should not be organised around individual substances but rather based on key functions or sectors.**

*This recommendation is connected to Conclusion 1 and Conclusion 4.*

Indeed, organising the prioritisation around key substances that need to be substituted implicitly directs innovation towards drop-in substitution, which may result in regrettable substitution. On the contrary, what is needed is sustainable substitution, which may be achieved by functional substitution (change of formulation / material, or process), revision of the necessary function itself, or even by a no-use scenario.

**Recommendation 3. Belgium should accept in its substitution strategy all substances of concern to human health and the environment and all relevant endpoints and not limit the roadmap to SVHC prioritised by the REACH Regulation. Priorities should be set on SVHC and complemented by other relevant substances.**

BAuA (German representatives in charge of occupational health) has suggested including more substances than SVHC (SVHC, POP, biocides, pesticides, dust, asbestos...) and all relevant endpoints (CMR, sensitizers, toxic...). We believe this recommendation should also apply for Belgium. Indeed, substitution is a relevant concept for all substances of concern for human health or the environment, regardless of the specific regulations that control them.

Including all substances of concern as targets for substitution may seem overwhelming at first. Consequently, we suggest that prioritisation of key fields of actions start with a review of present and future potential SVHC and followed by review of other substances that are of similar concern to the society, based on the suggestions of experts in the regions, notably experts in occupational health.

**Recommendation 4. Substitution, reduction of hazardous substances and risk management should be envisaged within a hierarchy, similarly to the principle “Avoid, reduce, compensate” that drives biodiversity protection strategies in Europe.**

- Substitution avoids exposing a population and the environment to a given hazardous substance and it should be given priority.
- When substitution is not sustainable, reduction of the volume of hazardous substances produced reduces the risk at source. However, this does not solve the potential issue of legacy substances since hazardous substances continue to be introduced into the material cycle, albeit at lower volumes. This causes a problem for future generations.
- The present roadmap should include both substitution and source reduction as potential elements of risk management

**Recommendation 5. Belgium should look at substitution as a long-term challenge**

If substitution of a specific substance is not currently sustainable, public authorities should support mechanisms designed to reduce substance use and/or to manage the risks in the short-term (via regulations, permitting and inspections), and achieve substitution in the future. These mechanisms may include:

- Increasing knowledge-base about key substances, functions and sectors and their alternatives using public research, existing bottom-up support schemes and potentially dedicated support schemes;
- Understanding and controlling the issue of legacy substances at the Belgian level; and extending this issue to the European level to reduce the dispersion of hazardous substances in secondary materials;

## II.2.2. THE CASE FOR A SUBSTITUTION ROADMAP

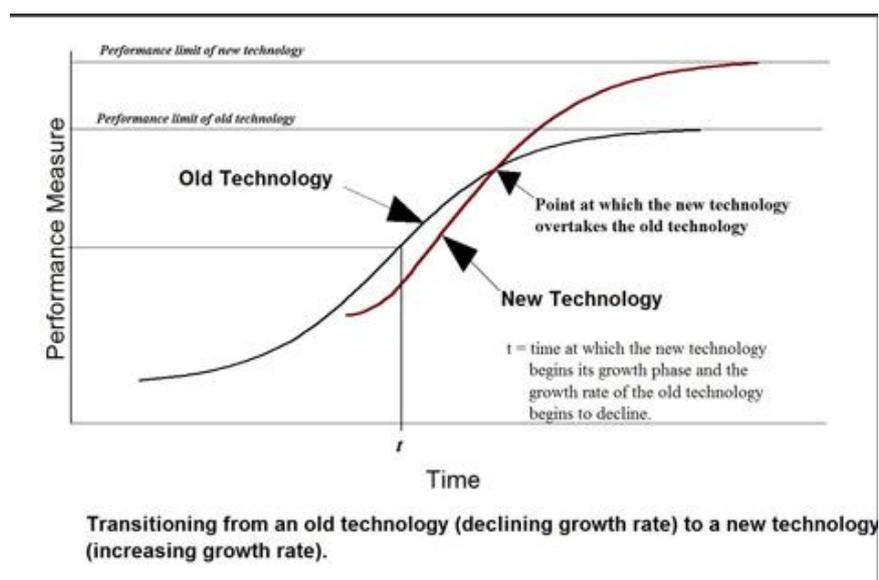
### Recommendation 6. A public strategy to support substitution should be implemented.

*This recommendation is connected to Conclusion 3.*

The industry is responsible for complying with legislation and the primary responsible party for substituting substances of concern. This affirmation should be highlighted by Belgian public authorities as this responsibility seems to be regularly challenged by the industry.<sup>5</sup>

The role of public sector in this effort should be to facilitate substitution. Indeed, a public strategy for substitution provides an opportunity to address existing policy and technology gaps (e.g., such as providing financial support and other incentives to the private sector) or accelerate substitution where it is sustainable (i.e., it considers the environment, human health and the economy in a holistic way).

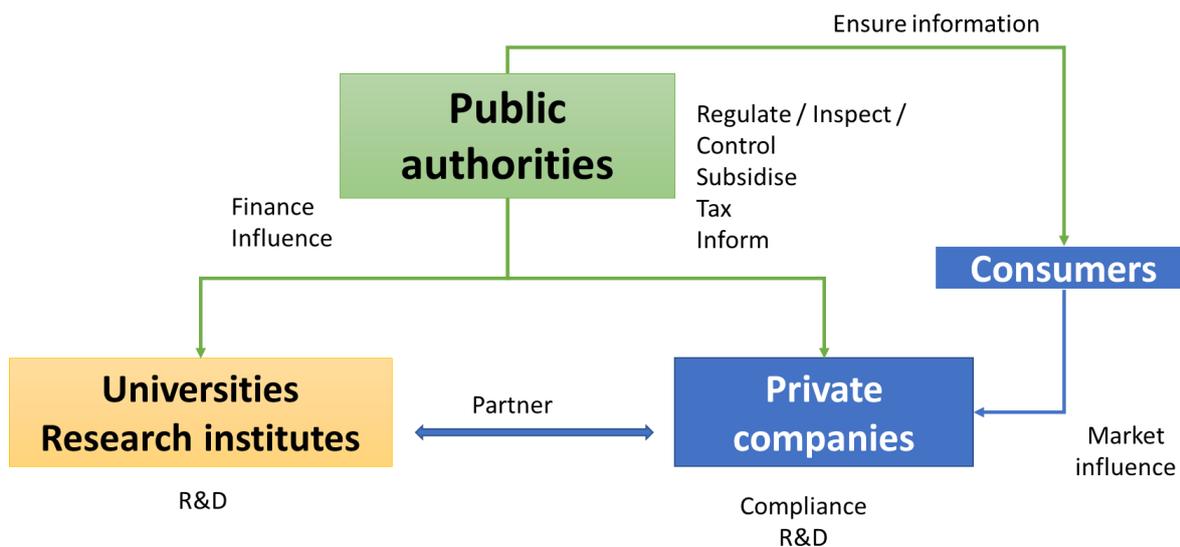
Substitution takes place along a standard curve like that presented below<sup>6</sup> – this is true from iPhone models to railways being supplanted by trucks. The shape of this curve can only be minimally influenced.



<sup>5</sup> Recital (12) of REACH: REACH does not affect the application of Directives on worker protection and the environment, especially Directive 2004/37/EC of the European Parliament and of the Council of 29 April 2004 on the protection of workers from the risks related to exposure to carcinogens or mutagens at work (Sixth individual Directive within the meaning of Article 16(1) of Council Directive 89/391/EEC) (5) and Council Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work (fourteenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC) (6) under which **employers are required to eliminate dangerous substances, wherever technically possible, or to substitute dangerous substances with less dangerous substances.** Article 55 of REACH: To this end **all manufacturers, importers and downstream users applying for authorisations shall analyse the availability of alternatives** and consider their risks, and the technical and economic feasibility of substitution.

<sup>6</sup> Credit image: <http://richmignogna.blogspot.com/2014/12/technology-substitution-requires.html>

In the policy environment set by public authorities, the industry shall be free to define their own business model and substitution strategy. Any action by the authorities can only increase the slope of a substitution curve or move it forward in time somewhat. The highest added value for top-down policies is where there would be a market failure to substitute directly because users are too small or unsophisticated to resolve the process on their own and do not invest enough money on R&D individually.



**Recommendation 7. Political awareness of the need for a substitution strategy needs to be increased to obtain the necessary resources (financial, political, technical) and to garner public support for the substitution strategy.**

*This recommendation is connected to Conclusion 2.*

Current resources are focused on compliance. Additional resources and coordination will be necessary to coordinate the substitution roadmap, which ultimately will require political approval.

The Inter-ministerial Conference Environment (ICE/ICL/CIE) would be the appropriate body in which to introduce the roadmap to substitution, begin raising political awareness on the subject and build approval of the proposed strategy.

### II.2.3. SETTING NATIONAL PRIORITIES

**Recommendation 8. Focusing public actions on priority subjects in terms of sustainability and relevance to Belgium will be key.**

*This recommendation is connected to Conclusion 4.*

Priority setting is key, due to the limited resources and the dispersion of competencies.

The governmental actors should pursue policies that suit their agency priorities and meet the needs of the country. The interest of the Belgian authorities should be for a:

- Smooth and effective implementation of regulatory actions against SVHCs decided at EU level;
- Facilitate and catalyse the innate innovation ability of technologically advanced players to substitute, driven by concerns for both sustainability and competitiveness;
- Focus specific actions on substances and sectors which either are domestic priorities (political/environmental/human health) or where there is likely to be a large incidence of uses or users in Belgium (so-called “vertical actions” in this study).

All benchmarked Member States have undertaken some degree of prioritisation, and some allocated significant resources to investigate the subject (e.g., France).

Considering the dispersion of competencies between the federal and regional level in Belgium and the relatively small size of the country, prioritisation will be key to ensure that actions are focused and coordinated efficiently.

Prioritisation is supported by all Belgian stakeholders, although opinions diverge regarding which actions should remain purely transversal and which should be influenced by these priorities.

As a general principle, Belgium should follow the guidance of the Dutch Safe Chemicals Innovation Agenda and decide on a list of priority functions / sectors / substances where they would like to see progress in substitution. These priorities would be decided based on their relevance for sustainability and their specific relevance for Belgium. Progress on these priority topics should be monitored to implement a staged approach.

**Recommendation 9. Priorities shall be set at national level in order to centralise information and facilitate enforcement. Priority setting should be coordinated by the federal level, with active contribution and validation of other parties.**

*This recommendation is connected to Conclusion 11 and Conclusion 12.*

Building a relevant strategy for substitution requires a diversity of skills and experiences, and enforcing it requires the broad panel of relevant competencies. Therefore, the national level (Belgium) is the only appropriate level to establish a roadmap to substitution.

The roadmap is envisaged as a cooperation between the federal level (acting both as the coordinator and as a party to the cooperation agreement), the regional level and other relevant stakeholders in the field of innovation.

Automatic acceptance of priorities set by the federal level by industry and regional stakeholders is seen as unlikely and undesirable by all parties. The regions are unlikely to undertake actions and pursue priorities they had no role in formulating and which they view as inappropriate or unimportant, regardless of federal directives. Such a strategy would likely result in political conflicts and poor enforcement.

As the repartition of competencies is not expected to change in the near future, nor is it desired by the different stakeholders, a Belgian roadmap to substitution can only be conceived as a cooperation between competent authorities of the federal and regional levels, both to set priorities and enforce transversal and vertical (top-down and prioritised) actions.

**Recommendation 10. The Belgian prioritisation approach should combine (1) review of existing data sources to develop preliminary lists of key subjects and (2) consultations with stakeholders to prioritise these and refine the list .**

*This recommendation is connected to Conclusion 12 and Conclusion 14.*

Developing quantitative risk indices to prioritise and rank substances, functions and sectors may seem like a very robust approach in theory, but it is cost-intensive and likely to face opposition by both the regional levels and industry.

Although this approach has been adopted by France, we conclude that it is not appropriate for Belgium.

Considering that some data are available from ECHA and several studies and data compilation exercises have already been completed by frontrunning Member States and NGOs, Belgium could use this experience as the basis for its prioritisation, rather than to reinvent the wheel. We suggest adopting an approach that is closer to the Dutch and German approaches, relying on data source assessment and stakeholder consultations.

Furthermore, we recommend that Belgium include an action to consolidate relevant data sources helpful for prioritization exercises in its strategy. These data would be available for future substitution prioritization efforts in Belgium or for other purposes.

#### **II.2.4. SUPPORT TO SUBSTITUTION: A COMBINATION OF TRANSVERSAL AND VERTICAL (TOP-DOWN AND PRIORITISED) ACTIONS**

**Recommendation 11. Transversal measures should be favoured for high-technology / low volume uses.**

*This recommendations is connected to sections II.1.1, II.1.2, Conclusion 3, Conclusion 5 and Conclusion 8.*

Transversal measures are more appropriate than vertical measures (top-down) for high-technology / low volume uses, usually the domain of chemical providers and high-tech companies.

High technology users generally consume low volumes (a few tonnes, generally far less) and require little specific support. Other factors that foster this approach include the following:

- Process control is high for high-technology products and, consequently, the associated exposure risks tend to be low regardless of the substance used;
- Safety performance is above average in the sector;
- Due to the specificity of the uses, in-house experts possess the most current knowledge on the substance and its use, compared to outside personnel. ;
- These substances usually get longer delays in authorisation to conduct their R&D.
- They usually understand that the risks and opportunities to substitute hazardous substances are a key part of their businesses. Some even find competitive edge by investing in substitution.

- They are represented by trade associations who follow the subject closely and can help them.

*Example: Trichloroethylene – yielded a dozen applications for authorisation. The applications were varied in scope and use. Some were –very technical, while others were bridging applications, and a few were relatively broad in scope s. There was very little coherence among the uses, and substitution was often technically impossible in the absence of advancements in material science;*

*Example: OPE/NPE (octylphenol/nonlyphenol ethoxylates) – the applications will be forthcoming but there will be many. Whilst similar, they all involve small-volume uses in highly controlled high-tech environment involving technical functions that are usually subject of stringent regulatory controls on performance.*

**Recommendation 12. A vertical (top-down and prioritised) approach should be favoured for downstream users and substances used in low to medium level technology, which usually means substances consumed in high to medium volumes.**

*This recommendation is connected to sections II.1.1, II.1.2, Conclusion 3, Conclusion 5 and Conclusion 8.*

The most appropriate use of top-down policies is for cases where there would be a market failure to substitute directly because users are too small or unsophisticated to resolve the process on their own and because chemicals and risk management is far from the user core business. This refers to downstream applications and applications of low to medium level of technology which also usually means substances consumed in high to medium volumes.

*Example: Bisphenol A used in thermal paper, glues used in furniture, ethylene dichloride, chromium Trioxide.*

The supply chain for substances in this category is likely to be long and a thorough understanding of the chemical function by downstream users is generally absent. Users generally do not have the technical/chemical expertise to substitute by themselves, and the substance manufacturer, who is (generally) non-Belgian, can play a higher role. There are recognised possibilities for partial substitution, but these are difficult to implement for a variety of reasons including lack of requisite knowledge by users, the cost of dual production lines, lack of recognised product durability data involving the substitution.

Additionally, multiple users use the same substance for the same application, whilst there is no competitive edge on the substance itself (competitive edge is focused on other aspects such as the choice of materials, article design, the image of the brand).

Therefore, this type of user needs:

- more technical support than high-tech users (e.g., access to information, highlighting business opportunities and compliance risks). However, they do not need new or specific financial support schemes. Financial support schemes to innovation already exist and are applicable to substitution projects, and allocated financial resources are deemed enough by consulted stakeholders. SMEs can already receive a higher proportion of financial support than larger companies.

- a push to collaborate (workshop, networking, call for project, Green Deal) when existing incentives (*de minimis*) are insufficient to generate coherent common interest and dialogue in the supply chain. Indeed, in the supply chain of low to medium level technology, even if R&D resources are allocated to substitution, they are generally dispersed among multiple users and offer no direct competitive edge.

**Recommendation 13. The public strategy should be conceived as a combination of transversal and vertical (top-down) actions**

*This recommendation is connected to Conclusion 3, Conclusion 5 and Conclusion 6.*

These types of actions can be divided amongst transversal actions affecting everyone and specific vertical actions affecting substances or industries. In the first instance the government is acting in its capacity as a good 'house father', and in the second it is pro-actively pursuing a specific goal. In both cases the action taken needs to combine a "carrot" and a "stick".

Despite the industry's reluctance, we see opportunities for a public strategy towards substitution that would be conceived as a combination of transversal and vertical (top-down) actions, as a staged and contrasted approach:

- Transversal measures

Transversal measures are those focus on increasing the broad knowledge basis (information website; trainings), helping the industry use existing support schemes (see below) and creating a climate of trust with the industry (workshop organisation, discussion tables, ...). Besides existing regulations (REACH, IED, Seveso) and their enforcement in Belgium, transversal and bottom-up (voluntary) schemes to support substitution should be preferred:

- for non-priority subjects for sustainability or for Belgium;
- when it is enough to achieve progress on priority topics;
- if top-down approaches are inappropriate (high-tech applications, see Recommendation 11).

Information actions should target stakeholders who are unaware or marginally aware of the importance of substitution, such as SMEs and downstream users.

- Vertical and voluntary (top-down) measures (e.g., specific call for projects, Green Deal, public procurement) should be preferred
  - if no significant progress is seen
  - if collaboration needs to be pushed (low-medium tech application, see Recommendation 12).
- Vertical and regulatory (top-down) measures

In order to incentivise substitution in priority cases where the market does not substitute spontaneously, public authorities must also be ready to use more stringent instruments in order to encourage the industry to move forward. Based on the benchmark, we see that regulation can create real drivers to substitution as demonstrated in France (CMR regulation) and in the Netherlands (ZZS list of priority hazardous substances that are the subject of specific measures by permitting

authorities). The relevance of taxation mechanisms for substitution should also be assessed in a dedicated project because this project could not conclude: identified examples are too young or have been abandoned for this study (Sweden, Denmark see in Appendix X).

The “carrot” and “stick” approaches should be dealt with by different types of administrations in order to stay credible:

- FPS Economy and regional administrations in charge of economy and support schemes should oversee the “carrot” approach and monitoring progress. Permitting authorities could also suggest some improvement to the industry.
- FPS Health, FPS Economy, FPS Employment, and regional authorities in charge of permitting and inspections should be responsible for activating the “stick” approach.

**Recommendation 14. For each prioritised subject, the choice of instruments will depend on the alternative technology readiness level, the competitive edge and the position of Belgian stakeholders in the supply chain**

*This recommendation is connected to Conclusion 3, Conclusion 8 and Conclusion 10.*

*Green: “carrot” approach: Orange: “stick” approach*

		No alternative	Alternatives exist but are not widespread or not tested	Alternatives are used by competitors	
		Voluntary substitution or slow substitution is sufficiently sustainable			
Before SVHC	↓ No use scenario is more sustainable	Public research			
Flagged as SVHC		Support to private Research	Support to private Development		Name and shame
			Taxation		Permitting rules Taxation
Support to private Development				Support collaboration (e.g., workshop)	
Taxation				Permitting rules Taxation	
Restricted (partially)	Enforcement			Targeted information	
Banned	Targeted information				

Typical trajectory

Below, we present the general scenarios for which each instrument is best suited.

- Public research provides the knowledge base on substance hazards, substance technical properties and it can lead to discovery of new substances. It is relevant at the beginning of

the substitution process to flag hazardous substances and potential alternatives, but it is relatively slow compared to industry's needs and not specific enough to address the full substitution process (e.g., substances usually are not tested at industrial scale).

- Private R&D can target to the specific needs of the industry including testing the proposed alternative solutions. Individual (company-specific) R&D is more appropriate when there is potential competitive edge at stake. Collaborative R&D is appropriate for most other circumstances and increases the potential for securing public financing due to the *de minimis* rules (threshold for state aids to individual companies). Public financial support to individual R&D shall not be granted to laggards (to keep up with competition) or to comply (authorisation dossiers).
- Taxation schemes are well suited to incentivise substitution when alternative substances are more costly than the SVHCs they would replace. The goal of a taxation incentive would be to drive industry to pursue a substitution remedy rather than opt for authorisation or exemption from restrictions.
- More stringent permitting rules which result in a restriction of substance uses are appropriate when sustainable alternatives are available.
- Taxation can be appropriate instrument to tackle imported articles, whereas permitting rules are appropriate for substances used nationally.
- Once a substance has been listed as a SVHC, workshops to showcase available replacement solutions could be helpful for companies learn about new technology, develop a peer network, discuss their challenges, and explore collaboration opportunities. Workshops are less appropriate to discuss substances that are only suspected SVHCs, where solutions are not yet available in the marketplace, and where competitive edge within a given sector may hamper discussion of potential solutions.
- Throughout the process, better use of available information from different sources (e.g., public research, NGOs, permits, alternative producers, other MS) is necessary, to demonstrate relevance and opportunity of substitution. It is imperative that this information be made readily available to all stakeholders in the substitution process.

In summary, the choice of instruments will depend on

- status of alternative technology readiness; this determines the type of innovation that is needed (understanding substance hazards, finding alternatives, testing them for a given application, or implementing it in a given facility)
- the position of Belgian stakeholders in the supply chain (substance manufacturer, mixture producer, article manufacturer, industrial downstream users or final consumers)
- the competitive edge in the market under investigation

**Recommendation 15. As a general principle, public financial support should only be used to aid frontrunners and not to help laggards comply (this is also illegal) with the legislation,**

*This recommendation is connected to Conclusion 5 and Conclusion 7.*

Therefore, financial support should not be granted to help industrials adapt production processes to widespread alternatives, or to finance authorisation dossiers. On the contrary, financial support can be used to develop alternatives, test their relevance and adapt processes in general. The possibility of financing companies to register alternatives should be investigated. Industry has reported that a lack of financing for registration is real impediment to introducing alternatives to the market. The legality of supporting the registration dossier is uncertain because registration is effectively a compliance activity (therefore not supported). But do so would likely help bring innovations to the market.

Companies that have not implemented readily available alternatives should receive only limited support, such as technical support in workshop environment (if the conditions to organise a workshop can be met i.e. no competitive edge and voluntary participation of the industry). Otherwise, the “stick” approach should be preferred to tackle laggards (inform of upcoming restrictions, make permitting more stringent, taxation...).

**Recommendation 16. A financially support strategy for substitution should include the following key elements: clarification of existing bottom-up schemes; and simplification of access to these by concerned stakeholders. Specific top-down financial actions may be envisaged only for priority subjects if the bottom-up approach proves ineffective.**

*This recommendation is connected to Conclusion 5.*

A dedicated channel to tackle substitution is not perceived as appropriate because

- 1) there are adequate support scheme channels and enough resources are available to support substitution overall.
- 2) innovation projects that contribute to substitution may not be envisaged as substitution projects at the outset. Therefore, a so-called “substitution financial support scheme” would not provide additional visibility.

The priority actions should be the following:

- Create a high-profile regional one-stop shop to help companies identify the relevant support schemes and clusters;
- Simplify the schemes where appropriate (e.g., reduce the number of different channels);
- Develop collaborations between the clusters and the regional administrations in charge of support schemes.

**Recommendation 17. Support both private individual and collaborative R&D without funding priority. Specific top-down financial support for collaborative research may be envisaged only for priority subjects if the bottom-up approach proves insufficient.**

*This recommendation is connected to Conclusion 6, Recommendation 16 and Recommendation 18.*

Private individual and collaborative R&D are complementary, and no financial priority should be given to collaborative R&D.

- Collective asset can be created by **financing public research.**

- Based on our consultations, creating a **dedicated framework to financially support substitution is not a priority** need of the industry and should not be favoured because it **can negatively affect** the visibility and efficiency of existing **support schemes**.

**Recommendation 18. The challenges of substitution should be communicated to bodies in charge of coordinating public research policy, so that these areas may become the focus of future research.**

*This recommendation is connected to Conclusion 6, Recommendation 16 and Recommendation 17.*

In general, fundamental and applied research needs to be financed in order to achieve substantial results. For substitution, the challenges of substitution should be communicated in an appropriate way to bodies in charge of coordinating public research policy (notably BELSPO, FNRS and FWO), so that they can contribute to substitution.

Although universities and research centres are not perceived as key R&D partners by consulted representatives of the Belgian industry, we believe that they can contribute significantly to substitution. Fundamental and applied research in fields such as toxicology, material science, chemistry and engineering continue to be important medium to long-term contributors to substitution solutions. Additionally, this contribution is recognised by other Member States, who encourages cooperation between universities, research centres and industry (e.g., via Carnot Institutes in France and RISE in Sweden). We recommend adopting a similar approach in Belgium as the context should be similar.

**Recommendation 19. Technical support instruments should be provided to SMEs and downstream users, who most need it.**

Technical support instruments should be either

- Horizontal, such as website and information tools, or
- Vertical, such as specific working groups, workshops.

The study undertaken by Sweden to draft its own substitution strategy has shown that technical support was needed, particularly for downstream users (furniture producers, e.g., Ikea) and SMEs (companies applying chrome plating for instance). On the contrary, the same Swedish study shows that large chemical companies and material providers have less need for technical support.

Having consulted representatives of chemical producers and high-tech companies, we believe this conclusion also applies for Belgium. These companies generally know their legal obligation to substitute, that substitution can be an opportunity, what the challenges are and where to find support schemes if needed.

However, the fact that chemical and high-tech companies do not require technical support to substitution does not mean that this support is not necessary in general.

Recommended technical support actions for the Belgian roadmap are the following:

- Transversal actions

- Increase the knowledge base related to substitution: highlight business opportunities (examples, case studies) and legal obligations, and explain how to implement substitution (relevant support schemes, case studies, trainings)
  - Facilitate networking opportunities by putting people together (event organisation, helping people coming together when relevant);
  - Provide a helpdesk that addresses substitution challenges by helping companies find information, build collaborative projects and identify relevant support schemes.
- Vertical actions could include specific workshops and help with collaboration on key subjects.

Workshops can contribute to networking and diffusion of alternatives, but their potential contribution is limited. Technical and confidential information will not be discussed during workshops, and attendees are likely to be industrials already active and concerned by substitution. In order to maximise the effect of workshops, we recommend that public authorities collaborate with relevant trade associations and networks in order to promote the event widely. Based on recommendations from other Member States, workshops need to:

- include the entire supply chain;
- be facilitated by a professional and independent facilitator familiar with substitution issues and the associated nomenclature. The facilitator should steer the discussion in the right direction by reminding the legal obligations of the industry towards substitution and by making sure that not only the obstacles to substitution are identified, but also potential solutions and perspectives.
- be organized in English in order to touch the entire supply chain and to favour collaboration between MS.

## II.2.5. THE ROADMAP AND COOPERATION

**Recommendation 20. Belgium should collaborate with other MS on subjects that are non-competitive for the industry (e.g., downstream uses, low to medium level of technology)**

*This recommendation is connected to Conclusion 13.*

On subjects that are non-competitive (downstream uses of imported products such as furniture or textile, use of one substance by multiple industries across the EU, such as chrome plating), Belgium should collaborate with other MS (repartition of subjects based on specific expertise).

Substitution issues that are related to downstream uses of imported products (e.g., furniture, toys) or to very diverse industries spread across the EU can be addressed more effectively by relying on expert MS and collaboration. This approach would save resources and increase effectiveness of actions.

Member States have specific expertise due to their experiences, notably with substance evaluation and restrictions dossiers. Expertise should now be developed in priority on subjects that are relevant to Belgium and should be disseminated to other MSs through workshops, technical and policy publications and seminars.

In conjunction with setting a list of priority subjects, Belgium should identify those subjects that warrant collaboration (e.g., downstream use, diverse non-competing industry) and those for which a national approach is preferable, e.g., to stimulate Belgium competitiveness in the global marketplace. Belgian authorities should be aware of workshops organised by other Member States (consult the list published by ECHA). When workshops are organised by Belgium on specific subjects (whether sponsored by the industry or by public authorities), public authorities should transmit this information to ECHA for distribution to other MS.

**Recommendation 21. A mindset of complementarity and shared responsibility needs to be introduced within the roadmap, clearly establishing the roles of each party.**

*This recommendation is connected to Conclusion 10 and Conclusion 12.*

Administrations generally tend to minimise their responsibility for incentivising substitution while inflating the responsibilities of other responsible parties.

**Recommendation 22. Priority setting should be coordinated by the federal level because it can centralise data originating from the regions, other MS, the EU and OECD.**

*This recommendation is connected to Conclusion 11.*

Some regional services that are currently not members of the Belgian REACH Committee should become involved in information collection: OVAM for waste-related issues, VITO for technical expertise, departments in charge of support schemes, permitting and auditing services (a provincial competency in Belgium).

**Recommendation 23. Creation of a network of experts on priority substances or group of substances would be valuable for risk assessment.**

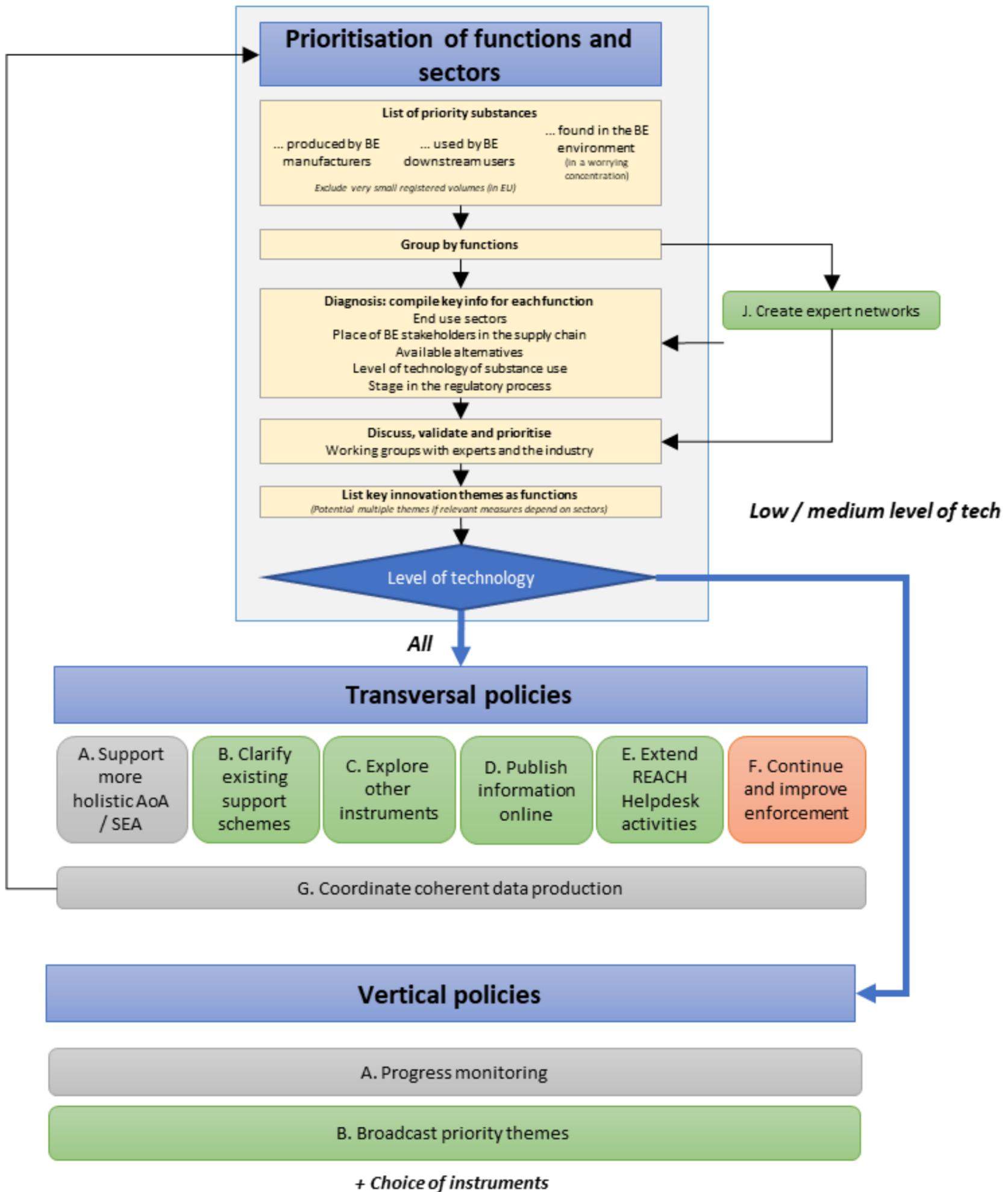
*This recommendation is related with Conclusion 13.*

Belgium should follow the French example and establish a network of experts for each key chemical group of very high concern that is deemed a priority for the country.

Independent experts from universities and research centres, and experts from the industry having knowledge of about the target substances should be part of these networks. Although their contributions would be varied, we envisage that the contribution of the industry would focus mainly on collecting raw data and providing information on substance use.

When an issue related to a group of chemical substances arises (authorisation, restriction, prioritisation of substitution issues), public authorities would consult with the relevant network of experts to obtain support for decision-making.

### III. The Belgian substitution roadmap



Green: "carrot approach", Orange: "stick" approach; Grey: neutral or case-by-case dependant

We propose to organise the roadmap into three stages:

- Stage 1: Development of priority themes for vertical measures
- Stage 2: Transversal policy instruments (cross-sectorial)
- Stage 3: Vertical policy instruments (top-down and prioritised)

## III.1. Setting priorities

### III.1.1. OBJECTIVES

We recommend defining priorities for 2 different objectives:

- Priority innovation themes (combination substance / final function and potentially sector) where Belgium would like to spur substitution are 1) relevant to Belgium 2) where public action is likely to deliver significant benefit compared to what the industry can do on its own. This approach could be modelled on the approach undertaken by the Dutch authorities to establish the Dutch Safe Chemicals Innovation Agenda.
- Priority chemical functions where technical expertise on toxicology and alternatives and networks needs to be developed in order to feed regulatory processes and the substitution strategy are 1) relevant in terms of sustainability 2) relevant to Belgium in particular.

### III.1.2. CRITERIA

The need for public intervention in the substitution process should be guided by relevance to national interests and the scope of additional benefit(s) that may be gained by public involvement.

#### 1) Substance relevance to Belgium<sup>7</sup>

It is pointless for public authorities to take specific initiatives for substances that present no particular concern to Belgium. Even if they are used by a few individual users, the transversal measures should suffice. Where there is broad use, public intervention can help catalyse a substitution process and speed up the substitution time-frame. The following questions are key for establishing relevance to Belgium:

- a. Is the substance manufactured by several Belgian companies?
- b. Is the substance in current use amongst Belgian downstream-users?
- c. Are there Belgian companies developing substitutes that could lead to technology exports outside of Belgium?
- d. Is the substance of particular concern to human health and environment in Belgium?

#### 2) Added value of public authority intervention:

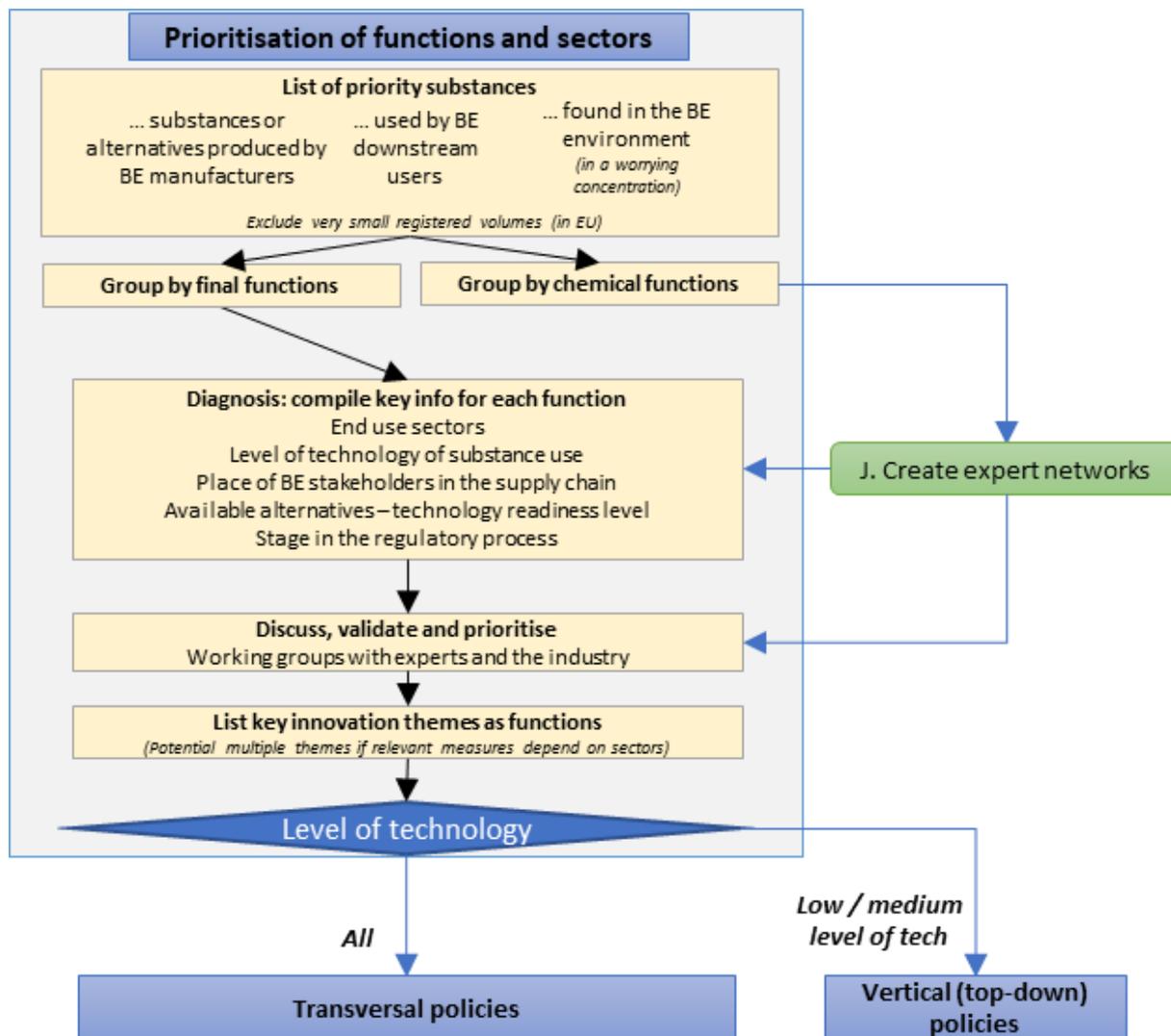
- a. Is the use characterised by a low to medium technology, similarity of uses and suspected options for partial substitution? If yes, then public intervention is helpful.
- b. Is the group of users sufficiently large for a joint action<sup>8</sup>?

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<sup>7</sup> This information is very basic – the idea is not for a comprehensive assessment, but a quick scan obtained from registration dossiers and known current policy priorities.

<sup>8</sup> This is more complicated but is information that should prima facie be available to the FOD Economie.

### III.1.3. METHODOLOGY



#### III.1.3.1. List of substances that are relevant to Belgium

First, the list of substances that are relevant to Belgium should be established by compiling:

- Substances of concern produced by Belgian manufacturers  
*Data sources: SIN Producers or ECHA database.*  
Complemented by specific knowledge of permitting authorities, if deemed relevant.
- Alternatives to substances of concern produced by Belgian manufacturers  
*Data sources: Marketplace, list of alternatives presented in authorisation and restriction dossiers (once compiled by ECHA as part of the follow-up actions of its substitution strategy)*
- Substances used by Belgian downstream users
  - Industrial uses: We recommend FPS Economy and FPS Employment to establish a list of key sectors in relation with the use of hazardous substances based on their

importance to the Belgian economy and based on the likelihood of occupational exposure.

Based on a reduced list of sectors, substances used can be examined by filtering lists of hazardous substances according to article category, sector of use and product category.

FPS Employment and regional authorities should have the opportunity to complement the list by including other substances of concern, i.e., in addition to SVHC.

*Data sources: SIN list, ECHA database, Securiwal, Brussels inventory of hazardous products, Flemish permitting data, SUMER project. In the future, digitalised permitting data may be used for this purpose.*

- Consumer uses. We recommend filtering the list of SVHC based on environmental release categories (ERC) and target only wide dispersive uses.

*Data sources: SIN list, ECHA database*

- Substances found in the environment.

We recommend having each region propose substances of concern based on environmental monitoring data.

*Data sources: ERPR database, regional-specific monitoring data.*

Finally, we recommend excluding substances with very small registered volumes and substances used exclusively in closed systems or controlled environment (using the Environmental Release Category).

### III.1.3.2. Grouping substances by chemical groups

Substances should be grouped by chemical group in order to define networks of experts who can address questions related to subjects such as toxicology, chemistry, substance uses.

We recommend using the list of SIN groups developed by Chemsec as the basis for naming the chemical groups.

*Data source: SIN list, ECHA database*

### III.1.3.3. Grouping substances by final functions

In order to avoid regrettable substitution, priority innovation themes should be established, by the final function of the substance.

*Example: the final function of flame retarding solutions is “fire safety”.*

Final functions can be derived from ECHA “product categories (PC)” or by an expert in chemistry (from FPS Economy, Health or a regional competent authority).

#### III.1.3.4. Diagnosis for each function

Each priority theme should be documented by compiling relevant

- Substances of concern;  
*Data sources: SIN list, ECHA database*
- Final use / application;  
*Data sources: SIN list, ECHA database*
- The level of technology (high, medium and low) should be characterised based on the following criteria:
  - Registered volumes: high technology uses generally require low volumes;
  - Number of registrants / similar uses: high number of similar registrants correlates well with uses in low level of technology;
  - Product category / end use sector.

*Data sources: SIN list, ECHA database, REACH IT*

- Position of Belgian stakeholders in the supply chain  
*Data sources: REACH IT, existing expertise from FPS economy, regions, clusters and complemented during working groups*
- Stage in the regulatory process  
*Data source: ECHA database*
- Risk: dispersive uses, risk characterisation factors  
*Data sources: ECHA database, SIN list or REACH IT to determine the environmental release category at this stage; REACH IT for the risk characterisation factor*

#### III.1.3.5. Prioritisation

Based on the information collected, the list of innovation themes should be prioritised according to their relevance to Belgium and the potential benefit of public action.

The following conditions should all be met for a theme to be deemed priority for top-down actions:

- Significant volumes are used or produced in Belgium;
- There is a significant number of affected stakeholders in Belgium;
- Exposure of Belgian consumers / employees / neighbours to the substance is likely;
- The principal uses are in Low to medium technology.

Stakeholder workgroups, including the industry and experts, should be organised to discuss the supporting information and final selection.

#### III.1.3.6. List innovation themes

Finally, innovation themes can be compiled:

- One theme per final function if measures are unlikely to depend on substances/sectors

- Several themes per final functions if measures will depend on substances /sectors (e.g., fire safety in construction vs fire safety in the EEE sector).

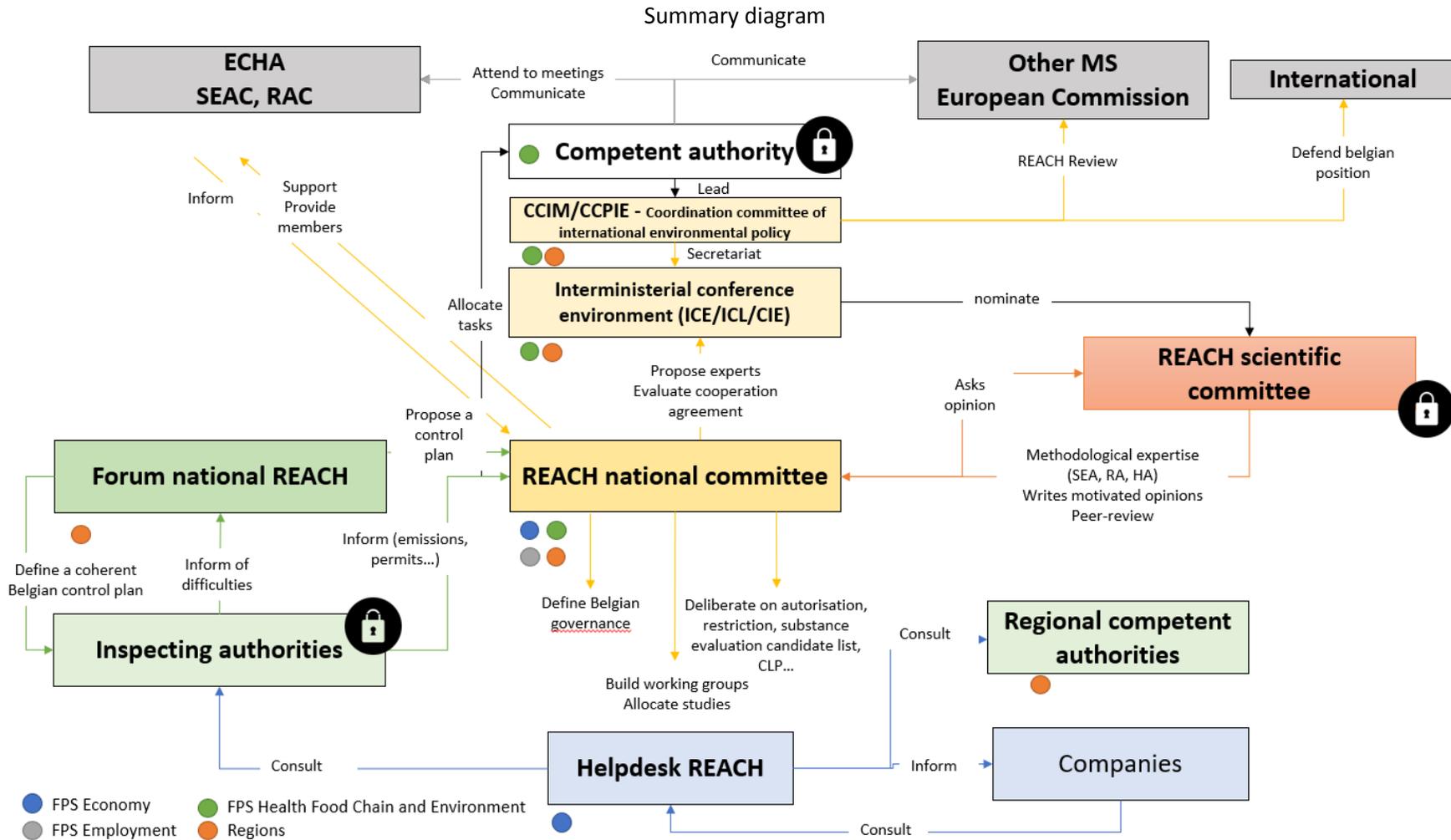
Available data sources are presented in Appendix XI.

## IV. State-of-the-art: Support to substitution in Belgium

This section establishes a state-of-the-art for the current substitution support mechanisms in Belgium including:

- Repartition of competencies between the different parties to the cooperation agreement
- Modes of collaboration
- Repartition of information and skills
- Current prioritisation modes in relation with substitution
- Technical or strategic support
- Financial support

### IV.1. The cooperation agreement



This section describes the tasks of each party to the cooperation agreement.

#### **IV.1.1. CCPIE/CCIM (COORDINATION COMMITTEE OF INTERNATIONAL ENVIRONMENTAL POLICY) AND INTERMINISTERIAL CONFERENCE ENVIRONMENT (ICE/ICL/CIE)**

International environmental policy is a complex matter considering that Belgium partitions of environmental competencies between federal and regional levels.

Formed in 1995, CCPIE/CCIM is the Belgian coordination committee which aims at defining the international environmental policy of Belgium and have Belgium speak with one voice at international level for many different topics (e.g., climate, chemicals, waste, noise, North Sea...). All federal and regional environmental ministries, administrations and agencies (OVAM, VMM) are represented.

CCPIE/CCIM has a Chemicals policy working group. This working group should be involved in the development of a national substitution strategy to help ensure that it addresses important concerns beyond REACH and SVHC.

**The General Assembly of CCPIE/CCIM (where ministry cabinets are represented) would be the appropriate committee to coordinate the substitution roadmap with European and international policies.**

The Interministerial Conference Environment (ICE/ICL/CIE) is the appropriate body for political discussions and negotiations of a non-international, non-European nature.

**ICE would be the appropriate venue for presenting the roadmap to substitution in order to raise political awareness on the subject among Belgians and to build approval for the proposed strategy.**

#### **IV.1.2. FPS PUBLIC HEALTH, FOOD CHAIN SAFETY AND ENVIRONMENT**

FPS PUBLIC HEALTH, FOOD CHAIN SAFETY AND ENVIRONMENT is called “FPS Health” in the rest of the report.

FPS Health is the Belgian competent authority for REACH. Its activities in relation with REACH include:

- **Coordination of the Belgian REACH Committee (BRC) and participation in technical committees at the EU (ECHA) and OECD levels**
- **Substance evaluation.** Member States oversee the evaluation of substances designated by the Member States committee as priority in the annual community rolling action plan (CORAP). Member States can inform ECHA of substances they would like to evaluate.  
Substance evaluation is primarily a technical description of its documented and suspected hazards.
- **Risk Management Option Analysis and opinion on the adequacy of proposed risk management measures (RMOA)**

Substance evaluation can lead to the adoption of risk management measures such as restriction, introduction of substances to the candidate list for authorisation, harmonised classification (CLH dossiers) or other actions outside the scope of REACH.

RMOA can be written by Member States.

- **Introduction of restrictions (potentially)<sup>9</sup>**
- **Inspections related to substance marketing.** FPS Health monitors that substances are well classified, labelled and registered.

Formal contacts between FPS Health and the industry occur mostly in relation to specific dossiers (e.g., when a substance is part of the authorisation, restriction, CLH process or substance evaluation).

FPS Health has a representative member in SEAC, where authorisation and restriction are discussed. This process also includes an analysis of alternatives.

#### IV.1.3. FPS ECONOMY

The missions of FPS Economy in relation with REACH include:

- **Participation to the Belgian REACH Committee (BRC)**
- **REACH Helpdesk.** The helpdesk assists the industry in understanding the legislation and their responsibilities but provides no interpretation of the legislation. Accordingly, substitution is not technically supported as part of the Helpdesk work.
- **Referring companies to adequate support schemes.** The REACH cell knows regional support schemes that can finance innovation.
- **Participation in European and international workshops.** In practice, resources are limited to support attendance of workshops organised by other MS.
- **Organisation of Belgian workshops, with the FPS Public Health**

FPS Economy has a representative in SEAC (also member of BRC), where authorisation and restriction are discussed. Both groups also consider the analysis of alternatives.

The REACH cell is composed of 2 people (part-time). It is part of the unit for sustainable economy (10 people). Since mid-2017, members of the REACH cell also contribute to other topics related to sustainable chemistry: plastics strategy, interface waste and chemicals, interface REACH and bioeconomy (bio-based alternatives), circular economy, nanotechnology, Ecolabel and more.

#### IV.1.4. FPS EMPLOYMENT

**FPS Employment** oversees the inspection of working conditions for compliance with health and safety regulations including exposure to hazardous substances, and for inspecting SEVESO sites.

#### IV.1.5. THE REACH SCIENTIFIC COMMITTEE

**The REACH scientific committee** is composed of the national public health institute and university researchers. One representative of FPS Economy and one representative of FPS Health also sit on the scientific committee, but they only act as observers and do not provide opinions.

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<sup>9</sup> SEAC assesses restrictions proposed by Member States or ECHA by performing an analysis of alternatives and a socio-economic assessment.

#### IV.1.6. REGIONS

**The Belgian regions** (Brussels, Flanders and the Walloon Region) oversee the inspection of classified installations and processing environmental permit; in this context, they remain alert to the use of annex XIV and possibly to SVHC substances. Permit instruction requires preliminary verification of compliance with REACH (e.g., authorisation, restrictions). The regions verify compliance with REACH after the permit has been granted, mainly during audits.

The 3 regions are parties to the cooperation agreement, and each has a representative on the BRC (Belgian REACH Committee), who also contributes to drafting Belgian positions. Each of the regions also has a representation on the CCPIE/CCIM.

##### IV.1.6.1. The Flemish administration: Department Omgeving

In the Flemish administration, the department “Omgeving” has the regional competencies related to space, environment, energy, climate and green economy, which therefore includes REACH. The department is the administration in charge of environmental permitting and inspections, including Seveso sites. For environmental permitting and Seveso sites, provincial teams located in the capitals of the 5 Flemish provinces have important tasks, in connection with a central administration located in the Brussels headquarters.

The department’s missions in relation with REACH are the following:

- **Contribution to the formulation of a Flemish position on chemical substances;** that later contributes to Belgian positions and policies;
- **Implementation of chemical substances regulations by the adequate services of the Flemish administration** in charge of permits, inspections and monitoring of the environment. Simply put, they certify that industrials comply with authorisation and restriction requirements. This coordination is ensured regionally by the Flemish working group on the risk management of chemical substances, which includes:
  - OVAM oversees substance management in the waste management chain;
  - VMM monitors the environment;
  - Several divisions of the Department Omgeving oversee inspections, permits, health and environmental issues, safety reports (Seveso), biomonitoring, waste policies and monitoring of chemical pollutants in the environment.

Flanders has developed a specific strategy regarding endocrine disruptors. The strategy (version of May 2018) lists past actions in relation with the strategy and defines further actions.

Most actions aim to increase the knowledge-base about endocrine disruptors: R&D to improve analytical methods, measurement campaigns in the environment, inspection campaigns. Collectively, these actions will aid efforts to understand the risks that various endocrine disruptors pose to humans and the environment and contribute to substitution initiatives.

The action related to nonylphenol (tensioactive) is the only one directly contributing to substitution currently. To date, the following steps have been completed or are in progress:

- Inventory of the use of nonylphenol in the industry, using measurements on wastewater discharge;
- Inclusion of limit values for nonylphenol in new permits/revised permits, when relevant;
- Work with the industrial sector to substitute nonylphenol (ongoing).

The ambition of the Flemish region is to develop a high level of regional expertise on endocrine disruption to help the region reach its goals of protecting the environment and human health. This expertise should also benefit national and international efforts to set priorities for these chemicals. . How REACH policy can contribute to substitution of endocrine disruptors is however unclear r, considering the EU lacks a definition for endocrine disruptors.

#### IV.1.6.2. Public Service of Wallonia

Public Service of Wallonia activities regarding REACH are the following:

- **Assessment of the impact of REACH on the Walloon Region**
- **Checking that industrials comply with authorisation/restriction obligations** based on the list of used substances provided by industrials as part of their permitting request, as well as onsite audits. A member of the Directorate for Industrial Risks in charge of the inspections is part of the REACH Forum. The logic behind audits favours support and advice over sanction, although the Directorate is also competent to deliver fines and penalties if necessary.
- **Warning industrials** whenever they use/store a substance that is likely to be subject to an authorisation/restriction or likely to be classified as SVHC, so that they can consider substitution.

The Walloon representative to the BCR is part of the **directorate for industrial risks**, which is also in charge of

- monitoring Seveso sites and all their hazardous substances depots: storage, process and logistic operations,
- monitoring the transport of hazardous substances per road and river.

The directorate for industrial risks is not in charge of permitting but it is consulted by the directorate for environmental permits when a company applies for an environmental permit in cases where there is a significant industrial risk (e.g., from hazardous substances, dust explosion). Other directorates in charge of air, water and soil are also consulted as part of this process.

#### IV.1.6.3. Brussels Environment

Brussels Environment activities pertaining to REACH includes **checking that industrials comply with authorisation/restriction obligations** for their CMR substances.

Brussels Environment checks that companies properly manage their chemical risks by requesting an inventory of their hazardous products whenever they apply for an environmental permit or a permit to use and store hazardous products<sup>10</sup>.

Brussels Environment (BE) focuses primarily on CMR in the impact assessment, by filtering declared products based on declared hazard mentions. For these products, BE checks whether they contain substances listed on annex XIV, annex XVII, the POP list, or are identified as PBT. The information provided is used, among other things<sup>11</sup>, as a preliminary check of compliance with REACH.

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<sup>10</sup> <https://environnement.brussels/thematiques/sante-securite/les-produits-dangereux/les-produits-dangereux-et-le-permis-denvironnement>

<sup>11</sup> classify hazardous chemicals depots, check chemical safety reports or safety impact assessment provided by companies, check the appropriateness of risk management measures for the neighbours and the environment, and decide the permit category.

## IV.2. Collaboration and cooperation between services

This section describes existing cooperation modes and exchanges of information between the different levels of competencies and inside each administration between the different services involved.

### IV.2.1. AT THE EU LEVEL

Member States exchange information on a platform called RIME which is an acronym for Risk Management Exchange. They meet 2 to 3 times a year to discuss their activities, avoid redundancy and discuss RMOA (choice between classification, authorisation or restriction).

### IV.2.2. AS PART OF THE BELGIAN REACH COMMITTEE

First drafts of Belgian positions on restriction dossiers and authorisation applications are prepared by FPS Health. In order to reach a Belgian position in the EU REACH committee or in public consultations, all parties to the cooperation agreement are consulted and a consensus is needed. In cases where consensus is not possible, the competent authority (FPS Health) sits in and represents its own position only.

**Consensus could always be found for Belgian positions, which suggests good collaboration.**

**Information is shared online via the SharePoint platform.** Information is mainly shared by the federal level to all parties. Information rarely comes from the regions (Brussels and the Walloon Region have reported no contribution to SharePoint).

**Information requests are shared via email or in person during meetings,** but there is no formal format for submitting information requests.

### IV.2.3. AT THE FEDERAL LEVEL

FPS Health and FPS Economy organise substitution workshops together.

### IV.2.4. BETWEEN THE FEDERAL AND THE REGIONAL LEVEL

FPS Health is the federal agency that has the most contact with the regions on matters of substitution.

- Regions are consulted by FPS Health about priority substances of concern to identify national priorities for substance evaluation. Regional responses are influenced by substances observed in the environment or at industrial sites. This process is voluntary and not addressed by the cooperation agreement. The response rate from the regions is rather low.
- Whenever FPS Health receives an authorisation dossier concerning a classified installation, it consults the relevant regional authorities and the federal inspectors to compare the dossier information with what has been observed during site inspections. Several inspecting authorities may be contacted, and they can inspect the industrial sites during the dossier evaluations.
- The regions are involved by the federal level for technical expertise when dossier issues are related to waste, or to air emissions.

FPS Economy answers questions received via the Helpdesk that relate to the legislation and its technical documents. When questions relate to the competencies of other parties to the cooperation agreement (policy issues or inspections), which is very rare, these are forwarded to the appropriate parties.

FPS Employment cooperates with the regions on Seveso dossiers via a specific cooperation agreement.

Regions report that it is difficult to complete information requests from the federal level, in a timely fashion due to the global workload and lack of digitized source information (permits for example).

**There is no collaboration between the federal and regional levels regarding technical or financial support to substitution.**

**There is no organised information exchange on substitution between the levels. Communication is based on opportunities and ongoing projects.**

#### IV.2.5. AT THE FLEMISH LEVEL

As mentioned above, the **Flemish working group on the risk management of chemical substances** coordinates the Flemish policy and coordinates several services of the department Omgeving, as well as VMM and OVAM. The authorities in charge of inspections and permitting are informed of REACH news via the working group.

In the team “Green Economy”, also part of the department “Omgeving”, the Flemish administration’s goal is to develop a sustainable economy, with no specific focus on substitution.

Omgeving has some contact with the Flemish department in charge of the economy<sup>12</sup>, primarily to educate them about the work of the environmental department. However, regarding REACH and substitution, the Flemish department of economy has more contact with the FPS economy than with the Flemish department for environment.

Omgeving is aware of authorities in charge of support schemes (VLAIO) but contact with the administration is the responsibility of the department of economy.

#### IV.2.6. AT THE WALLOON LEVEL

Information is shared informally at the Walloon level during **meetings of SPW DGO3, in an informal**. If a specific project is presented where used substances are likely to be classified as SVHC, i.e., subject to authorisation or restrictions, the Walloon BCR representative can flag potential issues related to REACH so that permit instructors and inspectors can inform industrials.

The directorate of industrial risks (DGO3) can refer companies to the department in charge of financial support. DGO3 policy officers are not aware of the support schemes in detail.

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<sup>12</sup> Not a party to the cooperation agreement

#### **IV.2.7. IN BRUSSELS**

All competencies related to substances of concern are managed within Brussels Environment.

Brussels Environment has no mission related to advising companies on the journey to substitution, and it is not aware of organisations in Brussels that specifically advise companies about this topic, besides Brussels Impulse. A specific cell should be created on the subject.

#### **IV.2.8. BETWEEN REGIONS**

There is no collaboration between regions regarding substance use.

The only collaboration in place refers to the transport of hazardous substances so that all regions have the same rules for transporting hazardous substances by road or river.

Inspection authorities within the regions communicate via the REACH Forum, whose aim is to have a coordinated inspection approach at Belgian level.

#### **IV.2.9. BETWEEN PUBLIC AUTHORITIES AND OTHER STAKEHOLDERS**

Contacts with NGOs are made at the federal level (open session of the Reach national committee).

Relevant contacts with the industry occur via these four mechanisms

- With the Belgian REACH committee, during open sessions.
- With the REACH Helpdesk for matters of compliance, but not in relation to substitution.
- With the regional administrations in charge of granting financial support to innovation.
- With the regional level for permit instructions and audits. In Flanders, some stakeholder consultations are organised at regional level for pesticides.

The Walloon administration has insisted on maintaining an atmosphere of trust with the industry, focusing on advice rather than sanctions, although they are competent to distribute penalties. The administration estimates that the collaboration with the industry on chemical and industrial risk is good.

### IV.3. Distribution of information and skills in relation with the substitution roadmap

Relevant information in relation with substitution is:

- Substance hazards (for SVHC and alternatives);
- Knowledge of substance uses, exposure, and occurrence in the environment;
- Knowledge of substance functions and potential alternatives, technical and economic feasibility of substitution and associated challenges;
- innovation policy: relevant resources and support schemes necessary to achieve the best outcome,

	Knowledge				Skills / background			
	Substance hazards	Substance use / exposure	Functions / alternatives	Innovation policy	Chemistry	Toxicology	Economy	Policy
<b>Parties to the cooperation agreement</b>								
FPS Health (competent authority)	•	•	•		•	•		
FPS Economy (Helpdesk / REACH cell)		(•)			•			
Flanders (department Omgeving)		•			•			•
Wallonia (directorate industrial risks / permitting)		•			•			
Brussels (REACH team / permitting)		•			•			
<b>Other stakeholders</b>								
FPS Health (other services)		•			•			•
FPS Economy (other services)		•		•			•	•
Regions (other services)		•		•				
Industry		•	•		•		•	

**FPS Health** is skilled at describing hazards and risks caused by substances, mixtures and substances contained in articles. Their team consists of toxicologists, ecotoxicologists and engineers.

Except for the few people working on restriction dossiers and for the FPS Health representative at SEAC, FPS Health has no experience in analysis of alternatives.

**FPS Economy's** REACH cell members in charge of the REACH Helpdesk have scientific background (one chemist and one bioengineer, both with PhDs in their respective fields). They rely on the experience and expertise of the rest of the sustainable economy unit (in economics, social science and political science) to complement their expertise.

**Regional experts** in charge of checking the conformity of permitting requests with REACH and certifying that chemical risks are being properly managed have scientific backgrounds, usually specialised in chemistry or in other engineering fields or in geography. A scientific background is considered necessary for this work because of the technical nature of industrial risks, risk modelling and risk management measures. In Brussels, the agents in charge of permitting may not be specialised in chemistry but they pursue focused training related to hazardous products and can consult with REACH experts who are more specialised. Within Omgeving (environment/surroundings), skills are mixed between policy and engineering, which is consistent with the transversal missions of the department and necessary for coordination of the chemical policy with the waste policy and water policy that are dealt by different agencies (OVAM and VMM, respectively). On the other hand, these experts have no background in terms of innovation and economy. They consult specialised websites are consulted whenever information is requested.

### **Conclusions**

Ensuring compliance with the REACH Regulation is the main objective of the cooperation agreement (deliver permits, conduct audits, evaluate substances and answer to helpdesk issues). The scientific background and technical expertise of personnel covered by the cooperation agreement are well aligned with these objectives.

However, a combination of regulatory instruments, economic instruments (innovation policy, taxation, public procurement) and collaborative projects is necessary to incentivise substitution. Therefore, additional skills in innovation policy, communication and collaborative project management (with the industry) will be necessary to overcome the challenges of substitution. Some of these skills are available within the competent authorities and in other teams. Therefore, these skill gaps could be addressed by expanding the cooperation agreements to involve the required experts.

Ensuring that substitution is sustainable and adequately supported by public actions requires critical understanding of many issues including the impact of alternatives on product manufacture, performance and cost. Generally, these data can only be supplied by the industry on a case-by-case basis. In addition to restriction dossiers and authorisation applications, public authorities should foster a climate where a dialogue can take place between the industry and the administration on the

challenges of substitution. In selected events such as workshops or public meetings of the REACH committee, the industry should be encouraged to present the challenges that they face.

The administrations (regional and federal) have enough scientific background to critically assess the information they receive and generally determine whether the data is relevant and produced using appropriate methodologies (e.g. toxicity tests, sanitary risk assessment). However, the personnel generally lack the technical experience and specific knowledge of each industry to identify missing / partially false information of a technical / market nature (e.g. lack of alternatives, inappropriate nature of an alternative in a given context). Of course, the administration cannot and should not be specialist for each case. Therefore, we recommend that the administration assemble a panel of independent experts (e.g., from universities or technical centres) whom they can consult as needed to assess specific information.

## IV.4. Technical or strategic support for substitution in Belgium

This section summarises existing technical or strategic support mechanisms for substitution in Belgium.

### IV.4.1. SUPPORT FUNDED BY PUBLIC FUNDS

#### IV.4.1.1. Public call for tenders

**Federal and regional administrations could technically support substitution by funding targeted studies** (e.g., for FPS Health financing the assessment of potentially hazardous substances in one specific sector) and making these results publicly available.

A constraint to design such call for tenders, however, is that they need to tackle a rather wide theme so that they are not directed to support one single company and should be related to the competencies of the tendering administration. Therefore, their results may be too generic to answer the effective information needs.

**No such call for tender has been developed so far.**

#### IV.4.1.2. Workshops

Workshops provide an opportunity to discuss the challenges of substitution for one substance or group of substances in one sector. Workshops generally involve substance users (intermediate and downstream users), producers of alternatives and public authorities.

In 2018, **FPS Health and FPS Economy** organised a **workshop to discuss the challenges of substitution in general terms**.

In 2019, FPS Health and FPS Economy hosted a workshop on the theme *Substitution of Bisphenol A in thermic paper applications*.

Technical support is also provided during events organised by other stakeholders to which FPS Health/Environment attend.

#### IV.4.1.3. VITO

**Technical support for substitution can be provided by Vito**, an independent Flemish research organisation in the area of cleantech and sustainable development. The organisation is partly financed by the Flemish administration, with the remainder of its funding coming from private consultancy.

Notably, the Best Available Techniques project, conducted by Vito and financed by department Omgeving, has the potential to advance substitution. Depending on sectors, this work includes the compilation of alternatives to hazardous substances and recommendations for production and use of chemical substances. Information is made available via reports available online<sup>13</sup>.

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<sup>13</sup> <https://emis.vito.be/nl>

#### IV.4.1.4. Advice given by permitting or inspection authorities

Some technical support for substitution is provided by the **regional permitting officers when an alternative is well known**. Otherwise, technical support is non-existent because it is not within the mission purview and their knowledge regarding substitution is very limited.

In Flanders and Brussels, each officer has discretion to provide information regarding substitution, but this is not common practice nor part of their assigned tasks.

In Wallonia, this information is provided intentionally by the Directorate for Industrial Risks as a complement to its permitting activities. An informal discussion is organised with the considered company when the public officers see substances that could be substituted/ that are likely to be SVHC, subject to authorisation or restriction in the permit request. If the company had no alternative, PSW would discuss it at the national REACH committee.

#### IV.4.1.5. Newsletter

A **newsletter** is published by the REACH Helpdesk (FPS Economy) from time to time, inspired by questions asked to the Helpdesk. It **can tackle substitution, but it is not targeted specifically** on this subject.

However, it is important to note that the existence of the newsletter appears not well known by industry (as reported by *essenscia*). For the newsletter to be more effective, it should be more widely advertised and better distributed.

### IV.4.2. PRIVATE INITIATIVES

#### IV.4.2.1. *essenscia*

*Essenscia* represents the Belgian chemical industry. It has 750 members including SMEs. (2/3 in Flanders, 1/3 in Wallonia).

The sub-sectors represented include cracking, plastic products, materials, chemistry, paints, lubricants. Members produce chemicals for different end markets including textiles and the automotive industry.

*Essenscia* has an overarching federal structure with regional and sectorial branches.

Members invest 4 billion euro annually in R&D (including but not limited to substitution).

*Essenscia's* mission is to solve the challenges of the future.

The federation helps its members comply with the chemical legislation. And as stated elsewhere throughout this document, substitution can be both a risk and an opportunity for its members, depending on their strategic positioning.

*Essenscia* has the following roles regarding REACH/ substitution:

- **Closely monitor the regulatory process at the Belgian and European level** as well as lists of substances of concern identified by researchers/NGOs. They **distribute this information to members;**

- **Help members find adequate support schemes** when they wish to conduct an innovation project, including substitution (individual support schemes provided by authorities such as VLAIO or collaborative projects in clusters);
- **Discuss priority research themes with clusters** such as Catalisti or Greenwin. Substitution can be part of projects supported by the clusters, but it is not a dedicated program nor a priority criterion in project assessment;
- **Inform members of calls for projects** launched by clusters;
- **Answer member questions regarding substitution and REACH.** Compliance and strategy are always the responsibility of members.

No detailed technical support is provided.

#### IV.4.2.2. Agoria

Agoria is an industry organisation representing the technology sector. It has 1800 members of which 80% are SMEs. Sub-sectors include:

- Materials industry: non-ferrous, foundries, wire drawing, producers of plastic articles
- Manufacturing industry: production systems such as automotive and farming machines, vehicles and intelligent transport systems
- Building, contracting and technical services industries: products for construction (e.g., ventilators, air conditioning, furniture)
- Aeronautics, Space, Security and Defence Industries
- ICT/digital industries: services and production of electronic devices
- Telecom: services, data centres

The organisation's headquarters are in Brussels and regional offices are based in Antwerp, Ghent, Liege and Charleroi.

Agoria is financed by membership. Most information/advice services are included in membership fee.

Approximately 2000 registrations have been made by Agoria's members. In terms of substances, Agoria represents producers and users of metallic/inorganic substances and users of organic substances. Agoria does not represent producers of organic substances. Some members use substances that are subject to authorisation or SVHC.

Substitution is perceived as both a risk and an opportunity by Agoria's members depending on their value chain (and place in it) and their product composition.

- **Risk:** For some applications, use of SVHCs requires filing costly authorisation dossiers with no substitution solution on the horizon. For other applications, the costs of substitution would be prohibitive, and a no-use scenario is thus considered (possibly by importing articles or shutting down production).

- **Opportunity:** For the front-runners, substitution is an opportunity to innovate and stay ahead of competition. But costs linked to innovation projects may increase product costs and, in some cases, negatively affect competitiveness against imported articles.

Activities of Agoria related to REACH and substitution include:

- **Monitoring chemical watch-lists** (e.g., list from ECHA/the EC and NGOs,) that post lists of substances under consideration for regulation, especially that chemicals that are likely to affect members.
- **Informing members about the REACH process**
- **Helping companies define their own strategies, notably the choice between authorisation and substitution:** Is substitution possible? Is investment relevant? What are potential consortia and/or can we help companies find a good consultant to develop their own defined strategy? There is **no solution which fits for every company**. The feasibility study and final strategic decision is up to the members.
- **Informing and advising about existing supports schemes** for innovation (individual companies)

No financial support is granted. Support is not prioritised, but rather focused on substances that are important for the members.

#### IV.4.2.3. VOKA

Voka, a Flemish network of companies, is the largest network of entrepreneurs in Flanders. Voka was founded in 2004, when the Flemish Economic Association and the eight regional chambers of commerce in Flanders decided to cooperate intensively in an alliance. Voka is the largest network of entrepreneurs in Flanders and represents the interests of companies to the highest level. Voka represents more than 18,000 companies in Flanders and Brussels, accounting for 65% of private employment, 70% of value added in Flanders and 80% of exports. Since 2008 Voka has been working closely with 29 sector organizations, which further strengthens the employer landscape.

- Voka connects: it is a dynamic network of companies made for and by entrepreneurs
- Voka builds bridges: between entrepreneurs and different sectors

Voka provides training, networking, info sessions and webinars in the Flanders Region and it supports research and development programs.

**Environment-friendly and sustainable entrepreneurship and Innovation are areas of interest, among others.**

#### IV.4.2.4. VARIO

The Flemish Advisory Council for Innovation and Enterprise (Vlaamse Adviesraad voor Innoveren en Ondernemen) was established by the Flemish Government in 2016. VARIO is the successor of the Flemish Council for Science and Innovation or VRWI. From 2010 to 2016, the VRWI was the strategic

advisory body of the Flemish Government for science and innovation. In turn, the VRWI was the successor of the Flemish Science Policy Council or VRWB, which was active from 1985 to 2009.

The VARIO **advises the Flemish Government and the Flemish Parliament on its science, technology, innovation, industry and entrepreneurship policies**. The council does this on its own initiative as well as on request.

The VARIO works independently from the Flemish Government and the Flemish stakeholders in the fields of science, innovation, industry and enterprise.

VARIO provides advice on the entire innovation chain, from non-focused scientific research at the universities and application-oriented research, to transformation of industry and services sector and Flemish entrepreneurship. For instance, VARIO developed a strategy for the Flemish Space Industry.

**VARIO can provide advice and help to shape policy and policy choices, including substitution.**

#### IV.4.3. CENTEXBEL-VKC

Centexbel-VKC is a technical centre of expertise for the textile and plastics processing sector.

Membership in Centexbel is mandatory for any company in the textile industry in Belgium. Membership in VKC is open to any company in the plastics processing sector located in the European Economic Space.

Membership provides access to information and preferential rates to **participate to research projects**.

**They have already worked on substitution and have completed comprehensive value chain projects.**

Below are summaries of 2 projects related to SVHC but more information can be found online: <https://www.centexbel.be/fr/projects>

**The LIFE FLAREX project (2017-2020)**<sup>14</sup> objective is “to reduce the impact of current flame retardants used in the textile sector and their future alternatives on the environment, human health and worker safety, by identifying the best technologies available, both from a performance and from a sustainability perspective. This will be achieved by developing an analysis of their environmental impact and functionalities in order to promote the substitution amongst the manufacturers”.

The LIFE-FLAREX project target products based on their functionality and market coverage. Analysis of the environmental impacts of the best available technologies being developed as an alternative to the current flame-retardants is an integral part of this study. Demonstration activities in industrial facilities will help ensure the replacement chemicals are technically, economically and environmentally viable. A comprehensive analysis of the best technologies (i.e., functionality, risk and toxicity management) will be disseminated in order to inform society and define the best non-toxic technologies in which research should focus.

The project coordinator is AEI TÈXTILS, the Catalan cluster of technical textiles. Six additional partners complete the consortium:

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<sup>14</sup> <https://www.centexbel.be/fr/projets/life-flarex>

- two Spanish technological centres/research institutes: LEITAT and the Institute of Advanced Chemistry of Catalonia (CSIC), both members of AEI TÈXTILS;
- the Belgian textile research centre CENTEXBEL;
- three technical textile clusters: ATEVAL from Spain, POINTEX from Italy and CLUTEX from the Czech Republic.

### Free Foaming (2015-2017)

This project was designed to provide a competitive and sustainable solution in response to the increasing demand of foam polymer products (e.g., insulation materials, lighter plastics.). It required reconsidering the foaming technology and the chemical agents that are being used production. The economically sound substitution of SVHC foaming agents is an urgent challenge for the plastics processing, textile, coating and other industrial sectors. Substitution means not only switching from one foaming agent supplied by one producer to another (in as far as they are available for the diverse polymers), but also adapting the related product development and production processes, including adaptations to the machinery. The approach of the "Free Foaming" project is outlined below:

- Screening and characterisation of foaming and nucleating agents that may be used in polymer foaming (thermosets, thermoplastics, composites, coatings)
- In the case of textile coatings: substitution of exothermic foaming agents with endothermic agents or combinations, for both plastics (PVC) and dispersions (acrylate or polyurethane)
- In the case of plastics: substitution of exothermic foaming agents with endothermic agents, evaluation of physical foaming, solid state pre-saturation, foam beads and micronized chemical foaming agents.
- (Semi) industrial trials
- Characterisation of the foam structures

Project funding:

- Catalisti
- Vlaams Agentschap voor innoveren en ondernemen

#### IV.4.4. FRIS – FLANDERS RESEARCH INFORMATION SPACE

FRIS (Flanders Research Information Space) is a regional portal established as a close cooperation between the Department of Economics, Science and Innovation and the knowledge institutions in Flanders. It aggregates all the publicly funded research in Flanders to increase its visibility and access. The portal is also an important source of information and inspiration for the Flemish government (e.g., reports, analysis and statistics for policy making, trends analysis).

Five Flemish universities and nine research institutions have already linked their systems to FRIS, ensuring their data feeds automatically into FRIS: KU Leuven, UGent, VUB, UHasselt, UA, INBO, ILVO, ITG, KMDA, Botanic Garden Meise, Flanders Hydraulics Research, Department 'Omgeving', VLIZ, ECOOM, KMSKA, Sirris, Centexbel (Textile competence centre).

The goal of FRIS is to:

- Accelerate the chain from idea to innovation by ensuring better information transfer between research institutions and innovative organisations.
- Reduce administrative burden associated with obtaining information on research
- Make the innovation strategies of government, industry and research institutions more efficient by offering correct, complete and up-to-date information.
- Make research data publicly available, so that everyone can use it freely.

Which information can be found on FRIS?

- Information on researchers, research, scientific projects and publications.
- the addresses of the active researchers in Flanders, the expertise of the researchers, an overview of the research and the results of their research.
- the profile and address information of the research units at universities and scientific institutions in Flanders. You can find the active research unit, as well as the expertise of the unit based on its projects and publications.
- description of the public funded research in Flanders since 2008 (a synopsis, a summary of the scientific discipline (s) in which the project is situated, researchers and organizations involved and the funding of the project).
- some types of publications of the Flemish universities and scientific institutions: books and contributions to books and journals (title, summary and authors of the publication).

FRIS also provides an 'Expert finder' feature to search for experts (person or organisation) based on a menu-option keyword search of the scientific disciplines in Flanders. This function and the supporting information were developed and are being maintained in consultation with FRIS partners at [ECOOM Hasselt](#).

**By exposing information from scientific research projects to the broader community, this portal provides an opportunity to accelerate information research (e.g. identification of alternatives) and build key partnerships (e.g., research-innovator-manufacturer, research-government) that can advance innovation, including in substitution of SVHCs. Scaling FRIS to the national level via a federal coordination would expand the database to include research from the other regions, benefiting the entire country by avoiding research replication and fostering collaboration.**

#### IV.4.5. CONCLUSION

Several public and private initiatives are in place to assist industrials with substitution but cannot be considered to fully answer the needs of substitution.

- Potential technical support from public authorities are rather generic (e.g. call for tenders, workshops, newsletter, BAT). When a company asks for dedicated technical support from the public authorities, resources are missing to provide it.
- Technical support from private stakeholders are usually sectorial and conditioned by membership. Substance producers, technology providers and some specific sectors (e.g.

textile, plastics) are well provided for, while no specific support could be identified for downstream users or small players outside industry federation.

## IV.5. Belgian public research

### IV.5.1. FEDERAL LEVEL - BELSPO

BELSPO is the federal body responsible for research policy in Belgium. It designs and implements research programmes and networks and manages Belgium's participation in European and international research organisations. BELSPO also supervises Belgian federal scientific organisations.

BELSPO runs the research programme "Science for a Sustainable Development" (SSD). Launched in 2005, the programme had a research budget of 65.4 million Euro for the period of 2005 – 2009. The programme is composed of 8 priority research areas: Energy, Transport and mobility, Agrofood, Health and environment, Climate (including Antarctica), Biodiversity (including Antarctica and the North Sea), Atmosphere and terrestrial and marine ecosystems (including Antarctica and the North Sea) and Transversal Research.

BELSPO also provides the government reliable data upon which to base its decisions in areas such as sustainable development, the fight against climate change, biodiversity, energy, health, mobility and the information society.

BELSPO issues calls for research proposals to all Belgian university institutions, public scientific institutions and non-profit research centres likely to be able to present projects. Candidate projects are selected based on their scientific merit by a panel of foreign experts.

Each research project, consisting of a network of funded partners, is associated with a follow-up committee composed of non-funded representatives of international, European, federal, and regional official bodies and scientific experts. This committee actively advise ongoing research and make data and information available.

Belgian researchers involved in the SSD programme have opportunities for involving international universities and research institutions in their research projects provided the collaborating institutions provide appropriate levels of co-financing.

Currently, no calls on chemical substitution is open.

### IV.5.2. REGIONAL LEVEL

#### IV.5.2.1. FNRS – Fund for Scientific Research (Wallonia-Brussels)

The Fund for Scientific Research's mission is to support basic scientific research within the framework of broader research initiatives advanced by researchers in the regions. It promotes the production and development of knowledge by funding individual researchers, and research programs at laboratories and departments at universities in the Wallonia-Brussels Federation.

In 2012, the FNRS created the **FRFS (Research Fund Fundamental Strategy)** funds high-quality research on strategic priorities for the Region and to provide upstream input for the innovation clusters. Two strategic axes have been created and financed by the Walloon Region: **FRFS-WELBIO**, for life and health sciences, and **FRFS-WISD, for sustainable development**.

The criteria for evaluating projects for funding include the scientific excellence of the researcher and the scientific merit of the proposed project, as well as the potential for exploiting the project results in the longer-term for economic development.

In addition, the FNRS manages FRIA (Fund for Research Training in Industry and Agriculture), which finances doctoral studies in fields related to industry and agriculture. FRIA funding is key for developing young talent to meet the burgeoning need of companies for researchers in the region. FRIA funding is provided by the Federation Wallonia-Brussels (€ 15.7 million in 2017) and the Walloon Region (€ 2.86 million in 2017). This level of funding supports allows to finance about 460 FRIA fellows. The annual funding provided by the Walloon Region has been reduced by almost 40% since 2015.

#### IV.5.2.2. FWO – Flanders Research Foundation

The Flanders Research Foundation (FWO) is the agency that supports ground-breaking fundamental and strategic research at the universities of the Flemish Community. The FWO also stimulates cooperation between the Flemish universities and other research institutes.

FWO is funded by the Flemish government, the Federal government, the National Lottery, companies, private entities. The focus/scope of funded research is broad, including projects related chemical engineering and material science. Some of these projects focus on topics relevant to SVHC substitution including safety and hazardous materials, sustainable development (e.g., life cycle analysis, recycling), environmental engineering and technology.

## IV.6. Financial support schemes

### IV.6.1. AT EUROPEAN LEVEL

#### IV.6.1.1. Horizon 2020 (the Framework Programme for Research, Development and Innovation)

Horizon 2020 is the 8<sup>th</sup> framework programme for funding research, technological development, and innovation. The framework programme is implemented by the European Commission, either by various internal directorate generals (DGs) notably the directorate general for research and innovation (DG RTD) or by executive agencies such as the Research Executive Agency (REA), the Executive Agency for SMEs (EASME), or the ERC Executive Agency (ERCEA).

The framework programme's objective is to coordinate national research policies and to pool research funding in order to avoid duplication. Horizon 2020 itself is also seen as a policy instrument to implement other high-level policy initiatives of the European Union, such as Europe 2020 and Innovation Union. Budget: €80 billion of available funding for the period 2014-2020.

Horizon 2020 provides grants to research and innovation projects through open calls for proposals. Legal entities from any EU country are eligible to submit project proposals. Normally funding is provided for 70 to 100% of the project.

Horizon 2020 is also implementing the European environmental research and innovation policy focused on greening the economy and society by adhering to principles of sustainable development.

The programme consists of three main research areas that are called "pillars":

- "Excellent Science" focuses on basic science. Budget: € 24 billion.
- "Industrial Leadership" is managed by DG GROW and based on Europe 2020 and Innovation Union strategies. Budget: €14 billion.
- "Societal challenges" funds projects that focus on potential solutions to social and economic problems.

Horizon 2020 will be succeeded by Horizon Europe which is currently being negotiated.

Horizon 2020 has been criticised for its very heavy administrative processes and the time required to kick-off projects. Some criticism also indicates that the project deliverables of the projects are frequently not operational.

Horizon 2020 evidently has the advantages of allowing cross-border cooperation which may provide collaboration opportunities for industries and sub-sectors.

The regional departments and agencies in charge of innovation and research in Belgium assist companies within their respective territories that wish to participate in a H2020 call. The Flemish EU Liaison Agency (VLEVA) also provides a database and administrative assistance to researchers seeking EU funding and wishing to participate in the various EU funding mechanisms.

H2020 has initiated calls for proposals dealing with hazardous substances. For example, in October 2017 it issued a call for projects related to **'Methods to remove hazardous substances and contaminants from secondary raw materials.**

#### IV.6.1.2. Eurostars

Eurostars is the European funding and support programme specifically dedicated to supporting SME research departments in their innovative R&D projects. The programme aims to stimulate international collaborative research and innovation projects that can be commercialised rapidly.

Eurostars is a joint programme co-funded from the national budgets of 36 Eurostars countries<sup>15</sup> and by the European Union through Horizon 2020. Participating countries earmark funds for their participants following national funding rules and procedures.

A Eurostars project can address any technological area for any market (but military) and be aimed at the development of a new product, process or service.

#### IV.6.1.3. LIFE

Created in 1992, the LIFE programme is the EU's funding instrument for the environment and climate action. The current funding period 2014-2020 has a funding budget of €3.4 billion. The programme is divided in two sub-programmes: Climate Action and Environment. The Environmental sub-programme, which can cover substitution projects, focuses on air quality, chemicals, green and circular economy, industrial accidents, marine and coastal management, noise, soil, waste, water, and the urban environment.

The programme provides action grants for pilot and demonstration projects that develop, test and demonstrate policy or management approaches. It also covers development and demonstration of innovative technologies, implementation monitoring and evaluation of EU environmental policy and law, as well as best practices and solutions. **The focus is on technologies and solutions that are ready for implementation in close-to-market conditions and can be launched at industrial/ commercial scales before the project ends.**

The following are examples of LIFE projects that are related to hazardous substances/substitution:

- LIFE\_PHIPP is a project initiated in 2017 to demonstrate the environmental benefits and cost effectiveness of a new type of building insulation made of recycled paper and hemp fibre. The new insulation mats are designed to be easy-to-install, structurally sound and with thermal insulation properties comparable to those of mineral wool. Other advantages include breathability, recyclability and health safety benefits. The product will be manufactured for about one-third of the cost of pure natural fibre material. It will be displayed and available in retail building material stores making it widely accessible to individual home owners.
- LIFE-BIOPAINT is a project initiated in 2017 to demonstrate a safe, sustainable and innovative continuous process for producing novel bio-based paints manufactured without petrochemicals. This process avoids NMVOC and greenhouse gas emissions, eliminates waste, reduces energy consumption and delivers improvements in product quality in the wood coating sector. A pilot plant with a production capacity of 20 tonnes of bio-based

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<sup>15</sup> <https://www.eurostars-eureka.eu/eurostars-countries/europe>

paints will be installed at IVM's premises in Parona. At full capacity, the plant will have the ability to produce 3 000 tonnes per year.

- LIFE GOAST project is a project initiated in 2016 to demonstrate the benefits of a new tanning technology on a semi-industrial scale. The technical feasibility of the technology, as well as its social and economic impact, was monitored and compared with the TCTP in order to demonstrate the reduced environmental impacts of the new process, while producing comparable or better-quality leather.

#### IV.6.1.4. COSME – Programme for Competitiveness of Enterprises and Small and Medium-sized Enterprises

COSME aims to improve access to finance for SMEs using two financial instruments that have been available since August 2014. It is managed by the Executive Agency for Small and Medium-sized Enterprises (EASME):

- the Loan Guarantee Facility provides guarantees and counter-guarantees to financial institutions (e.g., guarantee societies, banks, leasing companies) so they can provide more loan and lease finance to SMEs. From 2014 until 2020, it is expected that COSME will enable between 220 000 and 330 000 SMEs to obtain financing for a total value of between €14 and €21 billion.
- the Equity Facility for Growth provides risk capital to equity funds investing in SMEs, mainly in the expansion and growth-stage phases. The Facility is projected help between 360 and 560 firms secure equity investments with a total value projected in the € 2.6 to € 4 billion range.

COSME also funds the Enterprise Europe Network (EEN) with over 600 offices in more than 50 countries. The local EEN offices help SMEs find business and technology partners, understand EU legislation and access EU financing.

COSME also supports the implementation of the Entrepreneurship 2020 Action Plan through a wide range of activities including mobility exchanges, research, diffusion of best practices and pilot projects in areas such as entrepreneurship education, mentoring and development of guidance and support services for new and perspective entrepreneurs.

COSME also provides funding via calls for tenders. In 2018 a **specific call on substitution** was launched (250.000 €). The contractor is required to facilitate the development and dissemination of solutions in specific areas such as the bio economy, recyclability and biocidal products with the overarching goal of accelerating the substitution of certain chemicals substances with alternative solutions, thereby reducing the search costs for SMEs seeking alternative solutions to replace selected hazardous chemicals.

#### IV.6.1.5. European Investment Bank (EIB)

EIB is a major financial partner at EU level including for circular economy investments. During the last five years the EIB has provided EUR 2.1 billion of co-financing for circular projects that will have a positive impact on sustainable and economic growth, competitiveness and employment.

Promoting a circular economy, where the value of products, materials and resources is maintained in the economy for as long as possible and the generation of waste minimised, is a key EU policy priority. EIB joins forces with the European Commission and supports Member States in their transition towards a circular economy by providing financial support using an assortment of loans and investment instruments.

#### Loans and venture capital

The EIB provides a series of lending tools:

- Project loans for large developments in excess of EUR 25m
- Intermediated loans made via local banks
- Venture capital to help fund managers invest in high-tech and growth SMEs
- Venture debt to finance small, high-risk and innovative projects
- Microfinance
- Equity & fund investment private investment fund, that buys ownership in businesses (hence the term "equity") most often in the form of publicly traded common stock.
- Co-investment facilities

#### InnovFin, a specific mechanism for innovation

"InnovFin – EU Finance for Innovators" is a joint initiative launched by the European Investment Bank Group (European Investment Bank and European Investment Fund) in cooperation with the European Commission (*under Horizon 2020 – see information above*).

InnovFin aims to facilitate and accelerate access to finance for innovative businesses and other innovative entities in Europe. It strives to satisfy the unmet need for low-cost financing for innovative businesses who deal with complex products and technologies, unproven markets and intangible assets.

Via InnovFin financing starting at 25 000€, companies and other entities of all sizes can fund their investments in research and innovation (R&I).

An overview of available products is provided in the table below from the EIB website.

EUROPEAN INVESTMENT FUND		European Investment Bank The Global Partner			
Early-Stage Enterprises	SMEs	Corporate	Science	Thematic Finance	Advisory
InnovFin Technology Transfer	InnovFin SME Guarantee	InnovFin Emerging Innovators	InnovFin Science	InnovFin Energy Demo Projects	InnovFin Advisory
InnovFin Business Angels		InnovFin MidCap Guarantee		InnovFin Infectious Diseases	
InnovFin Venture Capital		InnovFin Corporate Research Equity		InnovFin Thematic Investment Platforms	
InnovFin Fund-of-Funds					
Early-Stage Enterprises, SMEs and Small Midcaps < 500 Employees	SMEs and Small Midcaps < 500 Employees	SMEs, Midcaps, Large Caps, SPVs	Research Institutes, Universities, Research Organisations	SMEs, Midcaps, possibly Large Caps, SPVs	Public and Private Sector Promoters
Intermediated Equity Financing	Intermediated Debt Financing	Direct and/or Intermediated Financing (including equity type)	Direct Financing (including equity type)	Direct and/or Intermediated Financing (including equity type)	Financial Advisory

Direct products
  Indirect products
  Direct or Indirect products

Note: InnovFin Large Projects succeeded by InnovFin Emerging Innovators  
 InnovFin MidCap Growth Finance is deployed under the European Fund for Strategic Investments (EFSI) since November 2016

### European Investment Fund

The EIF, part of the EIB Group, provides risk financing to small and medium-sized enterprises (SME)<sup>16</sup> across Europe. The EIF shareholders are the European Investment Bank (EIB), the European Union, represented by the European Commission, and a wide range of public and private banks and financial institutions.

The EIF develops and offers targeted financial products to its intermediaries (e.g., banks, guarantee and leasing companies, micro-credit providers and private equity funds), that in turn can offer these to SMEs.

The prime objective of the EIF is supporting EU objectives related to entrepreneurship, growth, innovation, research and development, employment and regional development, whilst generating an appropriate return for its shareholders, through a commercial pricing policy and a balance of fee and risk-based income.

Technology Transfer (transforming the results of research and development into marketable products and services)-is strategic focus area for the EIF.

Technology Transfer is often considered to be 'too new' or 'too high-risk' to be transferred out of the research laboratory and financed by the traditional investors. New discoveries and technologies may fail to realise their potential unless they become attractive to industry or downstream investors.

<sup>16</sup> Medium-sized companies: < 250 employees, ≤ € 50 m euros turnover or ≤ € 43 m euros balance sheet; Small-sized companies: < 50 employees, ≤ € 10 m euros turnover or ≤ € 10 m euros balance sheet

EIF therefore supports sustainable Technology Transfer structures or funds, that typically invest in projects or start-up companies at proof of concept, pre-seed, seed, post-seed to A & B rounds stages. Companies secure follow-up financing beyond these early stage via the normal Venture capital / Private equity investor channels.

Through the European Angles Fund (EAF), EIF provides co-invest with Business Angels and other non-institutional investors for the financing of innovative companies in the form of equity. EAF works close with Business Angels to help them to increase their investment capacity by co-investing in innovative companies at the seed, early or growth stage.

EAF currently has 320 million € in assets, with over 200 million € already committed to +/- 80 selected Business Angels for co-investments in more than 340 SMEs.

#### IV.6.1.6. COST

The European Cooperation in Science and Technology (COST) is a funding organisation for the creation of research networks, termed COST Actions. These networks offer open space for collaboration among scientists across Europe (and beyond), thereby providing impetus to research advancements and innovation.

COST is bottom up, meaning that researchers can create a network based on their own research interests and ideas by submitting a proposal to the COST Open Call. The proposal can be in any science field. The Actions are multi-stakeholder, often involving the private sector, policymakers as well as civil society.

COST receives EU funding under Horizon 2020. Researchers from universities, public and private institutions, NGOs, industry and SMEs are eligible for COST funding.

In terms of topics, COST Action topics are wide-reaching but they include Engineering and Technology. One project conducted between 2012 and 2016 focussed on substitution: *Sustainable flame retardancy for textiles and related materials based on nanoparticles substituting conventional chemicals (FLARETEX)*.

#### IV.6.1.7. M-ERA.NET

M-ERA.NET is an EU funded network established in 2012 to increase the coordination of European research and innovation programmes and related funding in **materials science and engineering**.

Since 2016 (and until 2021), the M-ERA.NET consortium has operated as a single network of national and regional funding organisations. M-ERA.NET is complementary to funding schemes available at regional, national and European levels. The consortium's key role is supporting the exploitation of knowledge along the whole innovation chain from basic research to applied research and innovation.

As a core activity, M-ERA.NET organises a series of joint calls for transnational RTD (Research Through Design) projects. These calls offer the European RTD community an opportunity to access coordinated funding across Europe and to gain access to leading knowledge world-wide. Over five years, the M-ERA.NET consortium aims to mobilise substantial national and regional public funding as well as EU funding.

M-ERA.NET allows for collaboration between academic and industrial research partners from and facilitates access to previously inaccessible new markets. The joint calls for transnational RTD cooperation mobilise a critical mass of public funding to support key players in materials research, foster development of key pan-European innovation/ partnerships and encourage newcomers to transnational RTD cooperation to develop innovative RTD projects.

#### IV.6.1.8. Private initiatives

Like at national and regional level, the EU level also features several private initiatives focusing on numerous topics, including substitution. In the context of this study, we highlight two initiatives: the initiatives launched by CEFIC, the European Chemical Industry Association and ZDHC, Zero Discharge of Hazardous Chemicals.

##### IV.6.1.8.1. ZDHC

The ZDHC is managed by a foundation in which a significant number of private stakeholders participate. The goal of the programme is to advance towards zero discharge of hazardous chemicals in the textile, leather and footwear value chains by implementing sustainable chemistry and best practices.

The ZDHC Programme focuses on 4 key areas and two critical cross-cutting areas. The four focus areas are MRSL (Manufacturing Restricted Substances List (MRSL)) and Conformance Guidance, Wastewater Quality, Audit Protocol, and Research. The two cross-cutting areas are Data and Disclosure, and Training.

- i. Manufacturing Restricted Substances List (MRSL): The ZDHC MRSL is a list of chemical substances banned from intentional use in facilities that process textile materials and trim parts in apparel, leather and footwear. It establishes acceptable concentration limits for these substances as impurities or by-products in chemical formulations used within manufacturing facilities
- ii. Wastewater quality: Well-designed, properly functioning wastewater treatment plants, good process controls and effective chemical management are key to minimising chemical, physical and biological pollutants discharged into the environment
- iii. Audit Protocol: The ZDHC audit protocol was developed to ensure consistency in environmental auditing across the value chain and sharing of audit findings. The Audit Protocol is supported by the ZDHC Chemical Management System (CMS) Guidance Manual released in 2015.
- iv. Research: The ZDHC Research List is a list of prioritised chemical substances for which there are no safer alternatives in the market today. It lists priority chemical substances that require additional research or substitution.
- v. Data and Disclosure: During the implementation stages of the Joint Roadmap, the need for integrated data management became apparent. The ZDHC Programme and its value chain participants including mills, tanneries, chemical companies and third-party service providers began exploring the challenges in data capture, reporting and global synchronisation.
- vi. Training: ZDHC Training is designed to support implementation of ZDHC standards throughout the value chain. Training is aimed at encouraging all parts of the value chain, including, brands, chemical suppliers, manufacturers and other intermediaries to adopt these ambitious chemical management standards.

#### IV.6.1.8.2. Long-Range Research Initiative CEFIC

The European Chemical Industry Association (CEFIC) runs the Long-Range Research Initiative (LRI) programme, which funds research that addresses the priority issues of the chemical industry regarding the health and environmental impact of chemicals.

LRI also aims to provide proactive scientific advice on which the entire industry and regulatory bodies can draw to better respond to societal concerns.

LRI also helps the industry with its own decision-making, especially during the innovation process, for companies to better understand the issues around introduction of new products or technologies.

LRI conducts peer-reviewed transparent research to:

- Improve risk assessment of chemicals and monitor the effects of chemicals on health;
- Understand the environmental factors in human health;
- Establish endocrine disruption references;
- Coordinate research, data and activities at a European level.

In terms of topical focus, the Programme is structured based on 3 core areas:

- **Innovating Chemical Testing:** these studies develop tools and approaches to reduce chemical testing costs, time and animal uses. The programme also funds studies that advance approaches for interpreting data from chemical testing as well as studies that facilitate the attainment of regulatory data requirements.
- **Understanding Everyday Exposures to Chemicals:** these studies generate predictive models to estimate consumer exposure and to address current exposure data gaps for most chemicals in commerce.
- **Translating Research Outcomes for Product Safety:** these studies advance chemical safety assessment and aim to increase consumer confidence in product safety and acceptance of innovation.

Substitution of chemicals, as such, is not a specific focal area of this initiative.

#### IV.6.1.9. Policy- initiative: Green Financial Labels (sustainable finance)

The European Union strongly supports the transition to a low-carbon, more resource-efficient and sustainable economy. One key of its key efforts in this arena focuses on building a financial system that supports sustainable growth by:

- re-orienting investments towards more sustainable technologies and businesses,
- financing growth in a sustainable manner over the long-term,
- contributing to the creation of a low-carbon, climate resilient and circular economy.

The Commission set up a technical expert group on sustainable finance (TEG) to assist it notably in the development of a unified classification system for sustainable economic activities, an EU green bond standard, methodologies for low-carbon indices, and metrics for climate-related disclosure.

The TEG began work in July 2018 and will operate until June 2019, with a possible extension until end-2019. Its 35 members (from civil society, academia, business and the finance sector, as well as additional members and observers from EU and international public bodies) work both through formal plenaries and sub group meetings for each work stream.

In May 2018, the Commission adopted a package of measures implementing several key actions announced in its [Action plan on sustainable finance](#), including:

- A proposal establishing the conditions and framework to gradually create a unified classification system ('taxonomy') on what can be considered an environmentally sustainable economic activity.
- A proposal introducing disclosure obligations for how institutional investors and asset managers integrate environmental, social and governance (ESG) factors into their risk assessment processes.
- A proposal creating a new category of benchmarks comprising low-carbon and positive carbon impact benchmarks. This will provide investors with better information on the carbon footprint of their investments.

Regarding the taxonomy proposal, the European Commission proposes the following list of 'environmental objectives':

- climate change mitigation;
- climate change adaptation;
- sustainable use and protection of water and marine resources;
- transition to a circular economy, waste prevention and recycling;
- pollution prevention and control;
- protection of healthy ecosystems.

However, substitution of hazardous chemicals is not explicitly mentioned. This type of policy initiative is expected to provide a boost to 'greening' financial market tools. Although environmental criteria are already integrated into many financing mechanisms, this initiative will make environmental criteria (even) more mainstream on a transversal and global basis across the EU.

#### **IV.6.2. AT BELGIAN LEVEL - SUPPORT TO INDIVIDUAL COMPANIES**

Research and innovation support for individual companies is available at the EU level, federal level and regional level via a wide range of tools including **subsidies, Public-Private Partnerships (PPP), risk capital, loans and warrants (public and private), and tax incentives.**

**Regional support is granted via a bottom-up approach** and not organised or structured by the administration. Reasons quoted for adopting a bottom-up rather than a top-down approach include the following:

- there are enough available financial resources for viable projects to access them;
- there is a will to allow initiatives to come from 'the field';

- this enables a simplification of funding tools.

For regional support schemes, **project prioritisation criteria** are in place and sustainability may be one criterion, but substitution *per se* is not a criterion. In Wallonia for example, every project funded under the research and innovation umbrella must integrate the sustainable development dimension and this is a criterion that is integrated in the evaluation process.

**Key aspects of project evaluation** for financial support are:

- **Project description:** It is important for the company to demonstrate that it is applying for funds to develop a **new** product/process/concept.
- Companies must show that they **go beyond regulation**. Subsidies for substances on the authorisation list are likely to be illegal.
- Compliance with *de minimis* rules is mandatory. Larger subsidies can be granted to a consortium than to individual companies.

In addition to the regional subsidies, the regional clusters (collaboration between public authorities, private companies and research organisations) provide additional financial support to individual companies.

Catalisti (the spearhead cluster in Flanders focusing on Chemistry and Plastics) has been created because the Flemish authorities see chemistry and plastics as crucial sectors for the Flemish economy (top-down). Catalisti's input and support are based on 4 strategic programmes: **Renewable Chemicals, Process Intensification, Sidestream Valorisation, Advanced Sustainable Products**. These strategic choices are set via intense discussions with companies and research institutes, i.e., bottom-up (what do companies need – what knowledge is available?).

**Support for substitution of chemicals is prioritised to a limited extent by the regional chemistry innovation clusters because they fall in one of their strategic programmes** (e.g., REACH-SVHC projects can fall into several categories but frequently they fall in the Renewable Chemicals category). However, strategic programmes are wider than substitution. Substitution is as such not an overarching priority, but it can be addressed bottom-up.

Industry and the regional public authorities view the clusters as extremely important and useful tools to underpin innovation in the business sectors. The regions highlight the need for interregional cooperation between the clusters. The recently approved interregional cooperation agreement between the innovation clusters for the chemical sector is seen as a positive development.

#### IV.6.2.1. Subsidies

Key funding mechanisms and programmes (without refund obligation) in support of research and innovation exist in each of the regions. Flanders, Wallonia and Brussels-Capital each have a specific body to financially support innovation and research in their respective region, independent from the REACH competent authority:

- VLAIO (Vlaams Agentschap Innoveren en Ondernemen) for Flanders;
- Innoviris for Brussels-Capital and;

- SPW DG06 for Wallonia.

Although there is communication among the staff of these three bodies, there is no structured dialogue between the bodies.

#### IV.6.2.1.1. VLAIO (Flanders)

VLAIO offers a series of subsidies such as Innovation and Baekeland mandates, Ecology premium+, support for R&D, Tetra projects,... (see separate fact sheets in Appendix IX.1.1), each one underpinning different types of projects in different parts of the R&D cycle, different types of eligible entities and budget.

Besides these funding programmes, VLAIO works via innovation clusters. There are two types of clusters: spearhead clusters (e.g., Catalisti) and innovative networks.

Spearhead clusters relate to strategically important areas whilst innovation networks are small-scale initiatives that are set up bottom-up and launched by companies that wish to target a specific, and usually newly developing--area.

**Substitution and sustainable development are not VLAIO priorities.** Some years ago, the latter was a criterion for research and innovation but due to “simplification”, this criterion was dropped. The idea was to fund transversal topics/projects and strive for a full-fledged bottom-up approach. The focus is rather short-term and designed to deliver **added value to the economy**. Projects must have an economic objective (jobs, competitiveness, and investments in Flanders), or tackle a societal challenge, or be related to the educational mission of the applicant.

A very important component in VLAIO’s operations are so-called “company advisors”. These are VLAIO officers who act as a point of contact for the development of a company, idea or initiative. Companies quite easily find their way to these advisors (directly or via the clusters). The advisors can also guide companies towards external advice, training and intellectual property protection.

For large investment subsidies (1M€), in Flanders, VITO and an external consultancy need to assess candidate projects together before providing funding.

#### IV.6.2.1.2. Service Public Walloon DGO6 (Wallonia)

Service Public Walloon DG O6 funds projects on research and innovation via a number of mechanisms and programmes (see fact sheets in Appendix IX.2.2). The support scheme, like that in Flanders, relies on a bottom-up approach and is based on clusters. The department is involved in preselecting projects that are launched by the clusters before a jury and a public selection proceed to the final selection.

Besides the clusters that focus on specific themes, such as substitution, there is no specific prioritisation of themes for research and development. This is because there are currently enough financial resources for viable projects to access them.

DG06 has regular direct contacts with companies. They routinely meet with companies early in the process to discuss projects. They also advise companies regarding proper completion of forms and submissions to help ensure the projects receive proper evaluation. The evaluation as such is conducted by the administration and the relevant ministry offices. Companies are generally well-informed about subsidies and how to access them.

**Sustainable development is a systematic criterion** used the evaluation of projects and disbursement of subsidies. The sustainability criterion is defined in a Walloon decree on sustainable development dated of June 27th 2013: *"development that aims at the continuous improvement of human quality of life and well-being, both locally and globally, and that guarantees the ability to meet the needs of the present generations without compromising the ability of future generations to meet their own needs. Its realization implies considering the rate of renewal of natural resources and the maintenance of biodiversity. It also implies continuing a transition process that mobilizes societal actors and social, economic and cultural functions, with a view to ensuring optimal use of all types of intangible, human, natural and financial resources and a continuous reduction in the use of non-renewable resources."*

**In summary, although substitution of hazardous chemicals is not targeted specifically in the DG 06 funding policy; it is part of sustainable development.**

#### **IV.6.2.1.3. Innoviris (Brussels)**

**Innoviris** functions according to very similar principles and funding mechanisms as VLAIO and SPW DG06. (see fact sheet in Appendix IX.3). **Substitution is also not one of its specific funding criterion.** But in its action plan, **Innoviris features Action 39 (sustainable chemicals)** which covers the completion of a feasibility study to ensure that infrastructure can incorporate innovations in the field of sustainable chemistry.

The table below provides an overview of the key funding programmes available from the 3 regional entities. Detailed fact sheets are available in Appendix IX.

Innoviris	VLAIO	Portail de la recherche (Wallonia)
<p><b>Boost:</b> Financial tool, up to 10,000 euro/year and covers 75% of the costs. Brussels- Capital Region. It is intended for small Brussels companies. It enables them to access quickly, and at a low cost, the competences of a research centre in order to have an innovative idea validated or to benefit from an occasional expert assessment to support an innovative project.</p>	<p><b>Baekeland Mandate:</b> Financial tool, 50% grant for a large company and a minimum of 60% for an SME. Flanders. Baekeland mandates support basic research that – if successful – have clear economic objectives and offers added value to the company involved in the project. The research should be directed towards obtaining a doctorate (PhD) diploma and meet the criteria for doctoral research.</p>	<p><b>Cwality:</b> Financial tool. Wallonia. Funding allocation: 35% for large companies, 45% for medium-sized companies and 55% for SME's. This program aims to support the development and validation of products, processes, industrial design or new services (PPS) intended to be valued economically in the short-term by the partner companies. The project will consist of experimental development in a company to develop a new product, process, industrial design or service (PPS) responding to market demand.</p>
<p><b>Connect:</b> Financial tool, covers up to 50%-75% of funding. Brussels- Capital Region Funding is allocated to Brussels stakeholders preparing a European RDI project. More precisely, it finances Brussels entities preparing a project linking one or several European entities with a view of obtaining funding or recognition from a European or supranational organisation.</p>	<p><b>Development Project:</b> Financial tool but also offers advice. Subsidy 25 to 50% of the project total with a support minimum of 25 000 Euros. Flanders. This type of project includes the development of a completely new or significantly innovative (improved) product, process, service or concept, and the result has an important impact on the performance of the company.</p>	<p><b>First Spin-off program:</b> Financial/ academic tool. Funding amount not specified. The main objectives are to increase the scientific and technological potential of a university or university research units. Valorisation and transfer this potential in Walloon companies and to train future business executives in emerging technologies, so that they disseminate them in Walloon companies where they continue their professional activities.</p>
<p><b>Explore Industrial Research:</b> Financial tool. Funding for small enterprises -- 70%; for medium enterprises-- 60%; and for large ones--50%. Brussels- Capital Region Through the Explore programme, Innoviris finances industrial research projects. Industrial research may be defined as all the actions, critical surveys and planned works carried out with a view to acquiring new skills and scientific knowledge in order to develop a product, process or service later.</p>	<p><b>Ecology Premium +:</b> Financial tool. The total amount of subsidies granted to a company amounts to a maximum of € 1,000,000 over a period of 3 years from the filing date. Flanders. This is a financial compensation to companies that will realize ecological investments in the Flemish Region.</p>	<p><b>Win2Wal:</b> Financial tool. Funding amount depending on project. This program aims to stimulate strategic research in universities or their associated research centres, ahead of projects identified by Walloon companies. In this context, "Strategic Research" refers to any research project applied downstream of basic research, in one of the areas identified in the Smart Specialization adopted by Wallonia.</p>
<p><b>Launch:</b> Financial tool. Funding allocation: small enterprises -- 45%; medium enterprises--s 35%; large enterprises --25;</p>	<p><b>Innovation Consortium:</b> Financial tool. Flanders/International. To promote cooperation</p>	

<p>collective centres: 75%. Brussels- Capital Region. Supports the creation of new companies (spin-offs) in the Brussels-Capital Region in order to economically promote the results of scientific research.</p>	<p>and coordination between the different research and innovation programs of the EU Member States and the associated countries, the European Commission has several networks within H2020 that contribute to the realization of the European Research Area (ERA). Through the participation of the Agency Innovation &amp; Entrepreneurship on these international networks, Flemish project partners can also receive direct subsidies from Flanders for their international collaboration on research, development and innovation (R &amp; D &amp; I).</p>
<p><b>Start:</b> Financial tool, the grant covers 50 to 70% of a budget with a maximum period of 3 to 9 months. Brussels- Capital Region. The new Start programme focuses on the technical (proof of concept) and business validation (proof of business) of the future projects and services. Start also gives the opportunity to present the working hypotheses to professional experts and established CEOs.</p>	<p><b>Innovation Mandates:</b> Financial, 50-100% of the personnel and operating costs of the postdoctoral researcher. An innovation mandate is specifically intended for postdoctoral researchers to carry out a project in close cooperation with the business world, either with an existing company or with a view to setting up a new company.</p>
<p><b>The rise:</b> Financial tool, a maximum of 500,000 euros per company is allocated as a grant. The Rise call for projects aims to highlight the most innovative Brussels start-up of the year. Brussels- Capital Region. This programme aims to reward the best technological company through the allocation of a grant of as much as 100% of the costs related to the implementation of its Strategic Innovation Plan (PSI).</p>	<p><b>Tetra projects:</b> Financial tool. Tetra project: min. 100,000 euro-max. 480,000 euro. Tetra preparation project: min. 100,000-euro max. 120,000 euro. Tetra cornet: min. 100,000 euro- max. 480,000 euro. TETRA projects aim to translate recently available knowledge into concrete, useful information so that the target group can innovate faster and more efficiently. This may involve new technology, recently completed research or existing knowledge from another domain or sector. This must be translated into concrete, useful information so that, in the short term after the end of the project, the target group can innovate faster and more efficiently.</p>

#### IV.6.2.2. Risk Capital – loans - warrants

##### IV.6.2.2.1. Public support ('participation funds')

The activities of the former federal Participation Fund have been transferred to the regions. In the Flemish Region, the credit activities have been taken over by **Participatiemaatschappij Vlaanderen nv (PMV)**, a Flemish investment company. **Brussels Regional Investment Company (GIMB) and Brupart** perform this function in the Brussels-Capital Region and **Sowalfin** does this in Wallonia.

#### ✓ **Flanders**

##### **PMV– Loans**

PMV business loans are long-term tailor-made financing solutions for SMEs and large companies. The minimum loan amount is 350,000 euros and the maximum is 5,000,000 euros.

PMV business loans can only fulfil part of the total financing need. These are always provided in conjunction with co-financing from banks, shareholders, managers, financial investors, or similar entities. PMV business loans can be both subordinated ("mezzanine finance"- ranked after bank or other financing) and non-subordinated, and they can be used to finance tangible and intangible financial investments and working capital requirements that are necessary to expand a business.

PMV business loans include various types of loans that differ from traditional (bank) financing and can have advantages for companies. For example, they can cover a longer duration (average term of 7 years and a maximum term of 10 years), be more flexible (e.g., defer part of the interest payment to the end of the term, postpone repayments of capital during the first two years of the loan).

Eligible entities: SMEs and large companies that have:

- a place of business in Flanders and / or added value for Flanders,
- a track record in generating positive cash flow,
- a solid position in the market,
- a well-balanced management team,
- a substantiated business plan that demonstrates enough capacity to repay current and future debts.

##### **PMV – Warrants**

PMV can also provide a warrant to lower the risk for banks who provide credit and to increase the creditworthiness of the business, hence facilitating access to credit.

Two types of warrants are available:

- A warrant of up to 1.5 million euros can cover up to 75% of the underlying credit. PMV organises this type of warrant in cooperation with 16 financial institutions.
- Warrants above 1.5 million euros covering up to 80% of the underlying credit. All credit forms are eligible. PMV also offers support in structuring the file and consulting with the banks.

✓ **Wallonia**

**Sowalfin** offers loans and warrants like PMV and GIMB (Biotech Fund Flanders).

A specific finance mechanism is **Easy'up**, a subordinated loan that envisages accelerating the commercialization of a product, process or service innovation for both technological and non-technological projects. The chemical sector is within its scope.

The loan term is 10 years maximum and covers up to 40% of the financing needs of the innovation project. The loan cannot exceed 500.000 €. The loan can be combined with other financial tools. In this case, public funding cannot exceed 75% of total financing requirements.

All expenses related to the innovation project are eligible. However, a project cannot apply for both Sowalfin and for the R & D aid or the economic expansion aid of the DGO6 (research and innovation Public Service Wallonia (SPW)) for the same expenditure.

Eligible entities

- SMEs,
- located in Wallonia,
- not considered as a company in financial difficulty.

✓ **Brussels**

The **Brussels Regional Investment Company (GIMB)** offers similar support as PMV and Sowalfin. It focuses on companies older than 5 years. When it deals with 'younger' companies, the GIMB acts through its subsidiary Brustart.

✓ **Federal level**

A state aid programme to R&D&I as part of Airbus programmes is available at federal level (shared-budget (50/50) between FPS Economy and the Public Service of Research and Scientific Policy).

The support consists of recoverable advance payments (subsidies are refunded based on sales). It is a bottom-up scheme and most candidates are individual companies.

The support is directed specifically to support Airbus suppliers located in Belgium (no other aerospace projects).

Sustainability is not really a criterion of the support scheme, which aims at supporting the sector in general. Technical and financial risks are screened. The innovative nature of the project is checked as well as the necessity of a state aid. FPS Economy oversees the assessment of the economic and financial criteria. FPS Research checks the technical validity of the project.

The support scheme is not specific to hazardous chemicals and substitution. Projects targeting the substitution of hazardous chemicals are not typical in this sector. Some projects have tackled chrome plating. Reducing kerosene consumption is a sustainability objective of Airbus and this has influenced some supplier projects (e.g., innovation related to the wing design).

The number of companies potentially affected by this scheme is very limited, and they are all aware of it. The administration considers this scheme to be very efficient (but it is not necessarily transferable to other sectors).

#### IV.6.2.2.2. Private support: Business Angels – private equity

##### Private equity

Sustainability has become an increasingly important aspect to the investment portfolios of many institutional investors ever since the establishment of the World Commission on Environment and Development by the United Nations. In addition to pure financial criteria, sustainable investment takes social and environmental aspects into account.

Private equity, more than other asset classes, focuses on companies with **innovative technologies and new business concepts and, therefore, is an excellent tool to support innovation in various sectors.** Over the years a growing number of dedicated sustainable private-equity funds have come to the market. And the majority of these private equity funds have a ‘sustainability’ department.

The advantage of private equity support is that traditional private equity funds operate on a decade-long fund cycle, or longer, which is strategic for technological developments. Private equity is of course linked to economic results, and, therefore, it is not suited for all types of innovation and dependent on the project’s stage of development or research.

##### Business Angels

Business angels contribute to entrepreneurs and companies financially and by leveraging their expertise, experience and contacts for the benefit of the project/company. They invest on average between € 25,000 and € 250,000. The support of business angels is important for starters and growing companies.

**Business Angels Network (BAN) Flanders** (BAN Vlaanderen) is the largest business angel network in Flanders. It brings together entrepreneurs who are looking for (venture) capital and knowledge from private investors. The network is a non-profit organization that acts as a ‘liaison agency’ between entrepreneurs and business angels. BAN Vlaanderen does not invest in business ventures but works solely as a matchmaking platform.

Every year this network receives more than 600 applications from companies. It matches almost 100 of these to a business angel. Twenty-five to thirty of these matches result in investment deals per year with direct capital provision of ± 5 million euros.

A company will pay a minimal fee to BAN Flanders as compensation for their ‘matchmaking’ work and training. In case of a successful match, the company will pay an additional fee. The amount depends on the financial contribution made by business angels via BAN Flanders.

The IT sector represents 30 to 35% of the BAN Flanders deals, with the remainder represented by more traditional industry. All projects affecting the BtoB and BtoC marketplace that are sufficiently large are good candidates for BAN involvement.

##### **Be Angels (Brussels and Wallonia)**

Wallonia and Brussels have an equivalent network: Be Angels. It operates similarly to BAN Vlaanderen, i.e., functioning as a matchmaking platform.

### IV.6.2.3. Tax advantages (federal level)

#### 1. Tax Credit for Research and Development

Companies that invest in patents and/ or **environmentally friendly investments in research and development (R & D)** can enjoy a tax credit (not compatible with the investment allowance for patents and environmentally friendly investments in research and development- see below)). The tax benefit is granted in the form of a tax reduction applied on the corporation tax that is due.

Eligible entities: Belgian companies and the permanent establishments of foreign companies in Belgium. Non-profit organizations are only eligible for this measure if they are subject to corporation tax.

What is eligible? The tax credit relates only to the acquisition of patents and fixed assets for the promotion of R&D for new products and advanced technologies that do not impact the environment or that reduce a negative impact on the environment.

#### 2. Innovation deduction

As of July 1<sup>st</sup> 2016, the up to 85% of the net income generated by intellectual property rights is exempt from corporation taxation.

Eligible entities: Belgian companies and the permanent establishments of foreign companies in Belgium.

What is eligible? The intellectual property rights that currently qualify are:

- patents;
- supplementary protection certificate;
- plant breeder rights;
- copyrighted software;
- orphan drugs;
- data and / or market exclusivity for plant protection products, medicines for human or animal use.

#### 3. Investment allowance

An enterprise that invests in the creation or expansion of its activities may, under certain conditions obtain an investment deduction. This is a tax advantage that allows the **deduction of a certain percentage of the acquisition or investment value from the taxable profit.**

Eligible entities: self-employed individuals, and small and large companies that receive profits from an industrial, commercial or agricultural activity. To encourage new investments, the one-off investment deduction of 8% was increased to 20% for new investments made between January 1<sup>st</sup>, 2018 and December 31<sup>st</sup>, 2019. This rate applies to both small companies, the self-employed and liberal professions.

What is eligible? Tangible fixed assets acquired or created in new condition to new intangible fixed assets. These assets must only be used in Belgium for the exercise of the professional activity and they must be depreciable for at least three years. 'Leasing' is also within scope.

**The system only applies to 'environmentally friendly' investments in research and development.** These are investments in research and development of new products and future-oriented technologies that have no effect on the environment or that try to limit the negative impact on the environment as much as possible. In order to benefit from this deduction, the company must have an R & D department. In order to prove this environmentally friendly nature of the investment, a certificate must be issued and be added to the declaration of the income taxes of the period in which the intended items are purchased or created.

#### 4. Exemption withholding tax for researchers

**Employers in the private sector and knowledge institutes are exempted at 80%** of the wage withholding tax on the **salaries of researchers** they employ. Since 1 January 2018, this measure has been extended to several bachelor's degrees. For these diplomas, the exemption will only apply to 40% of the amount due. From 2020, the exemption for bachelor's certificates will increase to 80%.

Eligible entities: The following groups may apply for exemption

- universities, colleges, scientific institutions,
- the National Fund for Scientific Research (NFWO) and the Fund for Scientific Research - Flanders (FWOV)
- companies that pay or award salaries to researchers with a PhD degree, civil engineer, industrial engineer and certain master's degrees or bachelor's degrees
- companies that pay or grant remuneration to researchers working on research projects covered by the framework of cooperation agreements concluded with universities or colleges in the EEA or with recognized scientific institutions;
- young innovative companies (YIC) providing academic staff (researchers, research technicians, project managers for research and development).

What is eligible? Research or development projects which have the following purpose:

- **fundamental research**, experimental or theoretical
- **industrial research**: planned or critical research aimed at gaining new knowledge and skills for development of new products, processes or services, or to significantly improve existing products, processes or services
- **experimental development**: acquiring, combining, shaping and using existing scientific, technical, business and other knowledge and skills for plans, schemes or designs of new, modified or improved products, processes or services. This also encompasses conceptual formulation and the design of alternative products, processes or services.

#### IV.6.2.4. Public-Private Partnerships

Specific factsheets on Catalisti, Greenwin and BlueChem are provided in Appendix IX.

##### IV.6.2.4.1. Clusters

Both the Walloon and the Flemish Government have decided to set-up (spearhead) clusters to underpin innovation in key sectors of their economy. Clusters are designed to facilitate cooperation between companies and knowledge institutes in a sector in order to boost companies' competitiveness; clusters cooperate very closely with public authorities and are partially funded by public resources.

With a view to good practices abroad, essencia has recommended their creation. Two specific clusters for chemicals exist in Belgium (Catalisti in Flanders and GreenWin in Wallonia).

In many dimensions, these two clusters are similar. Both have as a key goal to bring key stakeholders together and fostering partnerships based on the Triple Helix principle: public bodies, industry/business and research organisations. From a bottom-up approach yet in line with the broad policy agenda of their respective governments, these two clusters provide technical and networking support as well as assistance in obtaining funding and managing the projects that companies and research institutes bring to their table.

The necessity and the **added-value of such clusters is generally recognised** by public bodies, companies and knowledge institutes, and the fact that subsidies are attributed via a bottom-up approach is approved by all. Their added-value stems from the fact that they are a genuine **facilitator of contacts, projects and access to funding** for large and small companies whilst having a **mission to 'invest' public support optimally**. Within the policy framework and priorities, the clusters are relatively **hands-free in prioritising subjects and projects** in a way which is deemed efficient, especially in combination with an evaluation of projects and project support by the public authorities (VLAIO / SPW DG06 notably).

Clusters have full supply chain projects, and they try to include downstream users in the projects.

Clusters are regional in scope, which can affect project building. Support is exclusively dedicated to the regional stakeholders, even when the supply chain extends to the rest of Belgium or to other countries. Despite this fact and the absence of chemical cluster in Brussels, companies and research institutes see opportunities and sometimes even the necessity of cooperating across regional borders. **Consequently, an interregional cooperation was set-up in 2018 between Catalisti, GreenWin, VLAIO, SPW DG06 and Innoviris to better coordinate, facilitate and boost interregional innovation.**

Other relevant clusters for substitution that were not explored in this study are:

- SIM / Strategic initiative materials (Flanders)
- Plastiwin (Wallonia)

#### **Examples of substitution projects supported via Catalisti**

Although substitution is not a defined priority, Catalisti has piloted projects on substitution of SVHCs.

##### Example 1: MAIA – Manufacturing of Advanced & Innovative Bio-Aromatics

This project focused on finding a replacement for BPA from renewable sources, notably utilising the natural functionality of biomolecules by catalytically converting waste wood into lignin fractions and a

solid cellulose pulp. The focus of the project was on the production of aromatic molecules. This project was a collaboration between KU Leuven and 3 companies, and it yielded positive results for BPA replacement upon completion.

Example 2: FREEFOAM – Functional REACH Compliant, Ecologically and Economically Responsible Foaming of Polymer Products

This project focused on the replacement of ADCA (Azodicarbonamide), a substance on the candidate list for potential inclusion in Annex XIV of REACH. This was a proactive measure to address possible replacement. The first phase of the project consisted of a screening and characterisation study of foaming and nucleating agents. The second phase evaluated options for substituting exothermic agents with endothermic ones, or using combinations. The final phase involves conducting (semi) industrial trials to characterise foam structures.

The results of the project are the following: (a) companies were informed of changes in legislation; (b) alternatives were summarised and tested; (c) the study is the starting point for developing new foaming agents. This study was done by KU Leuven, Centexbel, Centexbel division VKC and Propolis.

Example 3: FROptiPlast – Flame Retardants for Optimal Plastic Applications

The project goals were four-fold:

- create an inventory of the available flame retardants, identify any synergistic effects and assess their usefulness for plastics (processing) companies;
- create an inventory of the recent research landscape (patent search) and latest techniques (state-of-the-art)
- create inventory and develop an in-depth understanding of the regional and European regulations, environmental legislation and toxicology related for flame retardants;
- develop a methodology for educating Flemish companies about the latest regulations and help them bring their products into compliance with these requirements.

The project involved the Ghent University, Centexbel and several companies.

**IV.6.2.4.2. Bluechem**

Bluechem is a project that will be launched in 2020 in Flanders (Antwerp) to support chemical innovation for start-ups. Bluechem (a real-estate and exploitation project) is **financed 50/50 by public and private resources**. essenscia, the Belgian chemicals and life sciences association is the main shareholder and partner of this project.

**IV.6.2.4.3. Venture capital fund – AAA fund**

For companies that have a large funding requirement, a **venture capital fund (AAA fund)** was established in which the private investors, the banks and the government work together. Together with BAN Vlaanderen, ING and the Flemish government (via the ARKimedea Fund II), the AAA Fund can invest more than 12,5 million euros of venture capital in Flemish SMEs. Most of the companies benefiting from these funds are start-ups with a very strong growth potential, but some are also

mature companies. The AAA Fund has a term of 10 years and an investment period of five years. It reviews 100 to 120 proposals per year and accepts 3 to 5 projects for funding.

## IV.7. Conclusion on support schemes

How the federal and regional levels in Belgium and by extension in the EU provide support, notably financial support to companies, sectors, researchers, organisations to underpin substitution of SVHC substances was the issue this study sought to address. Based on extensive research and contacts with key stakeholders, a clearer understanding has emerged

At regional, federal and EU levels ample financial (and technical) support tools exist to underpin research, innovation, entrepreneurship for both public and private initiatives.

Some tools explicitly refer to sustainability, whereas others address the environmental-friendly nature of investments, either in the conception of the programme (e.g., LIFE) or as eligibility criteria for obtaining funding (DGO6 SP Wallonia notably). Other programmes and tools are more flexible and fund or support projects that in general terms underpin research and innovation, often in relation with economic benefit for a region (VLAIO programmes for example).

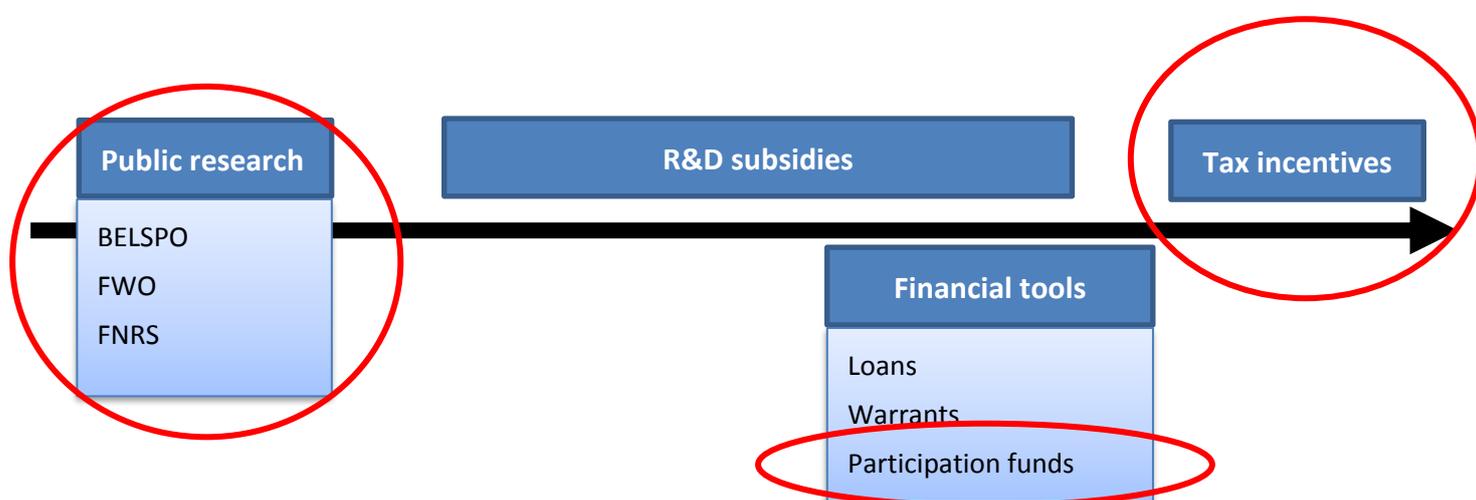
Substitution of hazardous chemicals/SVHCs is neither an explicit objective nor an eligibility criterion in any of the public tools and programs. Nevertheless, this does not mean that no substitution projects are run and (financially) supported. Private initiatives and spearhead clusters do conduct substitution project. However, there is currently no structured approach for providing support to substitution. Substitution projects are essentially run bottom-up, i.e., upon the initiative of companies, without top-down prioritisation and structuring.

Spearhead Clusters will continue to be a crucial tool to guide, steer and drive substitution of hazardous chemicals/SVHCs. The modus operandi of these clusters is bottom-up approach, which is efficient and does not require adaptation. However, a stronger top-down and political focus on substitution (e.g., for specific (sub)sector substances,) would benefit these clusters. Discussions of this approach should occur between federal and regional authorities and interregionally, consistent with the current division of competences in Belgium.

There are clearly enough financial resources available. However, there is concern regarding whether the financial tools are made available at the proper stage(s) during the evolution of a substitution project. Financial resources appear to be limited or inaccessible during the early upstream phase (public fundamental research) of a project and at the final phase of the substitution process (bringing to market).

The table below shows which financial support tools are generally used in the various phases of the substitution process. The 3 red circles indicate parts of the process, we believe adaptations and/or adjustments are necessary in terms of financial support. One of these is within the scope of responsibilities of the federal authorities; the two others will have to be dealt with in coordination between the federal and regional levels.

***Substitution process: from fundamental research to bringing the new substance/process to market – room for improvement***



**1. Boosting or re-shuffling public financial resources to public research**

Federal and regional levels should coordinate their efforts and available financial resources to prioritise fundamental research into substitution of SVHCs. They should also determine jointly which specific priorities are dealt with at which level. The Federal authorities should play a coordinating role.

**2. Participation funds**

The loans and warrants provided by the participation funds are intended to underpin the capacity and scope of financial support for companies engaged in substitution. However, a common criticism is that notably the terms these loans are very comparable to classical bank loans. A coordinated effort among the various participation funds should remedy this situation.

The initiative taken at EU level regarding 'Green' Financial Labels (in the context of sustainable finance) will help to boost access to financial tools and resources. The implementation of this concept at the Belgian level and additional promotion of these labels should be encouraged.

**3. Tax incentives to bridge the final market launch of technologies/ substances for substitution**

One of the key financial tools the federal government has at its disposal is tax incentives. These are particularly relevant in the final stages of bringing new technologies to market. Boosting tax incentives for environmentally sustainable technologies/processes is key. One could even contemplate linking a tax incentive explicitly to substitution.

In addition to providing financial tools, the Belgian federal authorities have a fundamental role in information-gathering and disseminating information on financial, technical and other support tools to the various stakeholders involved in substitution at large.

Some stakeholders are very well-informed through existing initiatives at the regional level, notably from company advisors in VLAIO, the FRIS portal and the spearhead clusters. Nevertheless, there is still a substantial number of stakeholders (e.g., downstream users, SMEs) that is insufficiently aware of opportunities and threats regarding SHVCs and will not think of proposing an innovation project in the field.

With some enhancements, the REACH Helpdesk could be the ideal instrument to provide/centralise the relevant information. This approach would also interject a 'human' interface /point of contact into the process, and this person could also serve as an advisor for stakeholders by steering them toward the proper technical and/or financial assistance related to substitution.

A more global awareness-raising campaign on the importance and opportunities related to substitution should certainly also be considered. In terms of providing state-of-play on research, the FRIS Portal of the Flemish Government is a very useful resource and could--provided that regional and federal level agree--serve as the basis for extending information on research to other regions, with the federal authorities playing the coordinating role.

## IV.8. Prioritisation in relation with substitution

The interviews have shown that the **Belgian public authorities generally do not prioritise** their work explicitly **based on the potential and/or priority of substitution**. Therefore, they have not developed a specific expertise related to key substitution issues and priorities. We have identified **two opportunities for competent authorities to develop expertise on key subjects in relation with substitution**.

### IV.8.1. SUBSTANCE EVALUATION AND WORKSHOP ORGANISATION

**There is direct link between the experience of Member States on specific substances/sectors and their capacity to promote substitution.** As part of ECHA's new strategy to promote substitution, ECHA recommends that Member States organise thematic workshops on substitution based on their specific expertise or their key needs. For example, the Netherlands recently organised a workshop on anti-fouling substances, Belgium organized one focusing on Bisphenol A, and Germany hosted one on pest control substances.

**Member States competent authorities have all developed specific expertise on key substances, substance groups/functions and hazard types. In practice, this expertise is developed based on professional experience** (e.g., manual screening of registration dossiers, substance evaluation, authorisation and restriction dossiers, historical national regulations, internal skills from previous positions) **and not as a specific strategy directed towards substitution**. Member States having specific expertise are the most likely to provide technical input to RMOA propositions and to introduce restriction dossiers for these substances and similar substances, to ask or be asked to evaluate similar substances..., thus furthering this expertise.

**In Belgium, FPS Health consults competent services, including those available at the regional level, in order to prioritise substances of concern for substance evaluation.** Industrials are not consulted at this stage, but only once substance evaluation has started. The responses and advice provided by competent authorities are based on substances of concern that have been found in the environment or are of concern in the workplace.

**This consultation process could be an opportunity for Belgian authorities to prioritise substances / sectors or group of substances. However, the response rate of competent services is rather low, and this process is not currently perceived as connected with the substitution strategy.** A possible reason for this is that substance evaluation is very early in the process. It is true that it would be difficult to prioritise substances until we have knowledge of their toxicity in the environment/workplace. However, priority hazards phrases, sectors and technical functions could be targeted for substance evaluation based on known information.

#### IV.8.2. FLEMISH BEST AVAILABLE TECHNIQUES PROCESS

**In Flanders, sectorial knowledge on industrial emissions and practices is developed via the Best Available Techniques process.**

BAT is the cornerstone of the Flemish policy related to substance use. As a complement to the European BAT process developed by the Joint Research Centre, the Flemish administration request of VITO to develop BATs. Once included in the VLAREM regulation, Best Available Techniques and associated emission levels are made mandatory and included in permits. Additional requirements can be added in permits, on top of BAT. Besides the regulatory framework, BAT are important guidance documents that should be followed voluntarily. Despite this local work, the evolutions at the European level are the main driver for new Flemish regulation and actions.

For the development of BAT, the Flemish administration agrees yearly with VITO regarding the budget and content of the work to be conducted for the administration, as part of the so called “Referentietaken”. It is a wide negotiation for all activities of VITO (climate, BAT...). Regarding BAT, priority subjects are influenced by:

- the hot topics that pop up in the Flemish environment (for instance those witnessed by OVAM on waste and the interface waste/products, by the VMM in charge of monitoring air, water and soil, the topics witnessed by colleagues involved in permitting and inspectorate, waste management)
- substances that are known as climate change contributors
- priorities at Belgian level (REACH committee)
- specific political priorities (endocrine disruptors, glyphosate).

The approach to choose subjects is not structured via defined criteria but agreed upon during yearly negotiation meetings. VITO gives its opinion and the sectors are consulted.

Some BAT indicates SVHC use and efforts of the industry to find safer alternatives<sup>17</sup> but there is no specific highlight of SVHC in the BAT development process in general, this is sector-specific.

**Without changing the focus of the BAT development process (informing the VLAREM regulation and permitting), SVHC use could be more systematically screened in new BAT development process and a specific synthesis on this issue provided to the attention of the Belgian REACH committee.**

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<sup>17</sup> [https://emis.vito.be/sites/emis.vito.be/files/pages/1142/2014/BAT\\_for\\_the\\_textile\\_industry\\_full\\_version\\_0.pdf](https://emis.vito.be/sites/emis.vito.be/files/pages/1142/2014/BAT_for_the_textile_industry_full_version_0.pdf)

## V. Benchmarking practices at European level and in other Member States

In this section, we have compiled identified actions undertaken by public authorities to help the industry with substitution and/or to prioritise the said actions. The benchmark was conducted at European level and for 4 Member States. Relevant lessons learnt were compiled individually for each Member State.

The critical analysis of how applicable these lessons are to Belgium is presented in the conclusions.

### V.1. At European level

**ECHA published its first substitution strategy in January 2018.** Four strategic action areas are developed in this strategy:

- **Supporting the organisation of supply-chain substitution workshops by Member States and the industry.** Proposed support to organisation includes:
  - Identifying themes that are relevant for a workshop and encouraging Member States that have expertise on the subjects to organise the related workshops;
  - Disseminating information about workshops to its network;
  - Helping organisers define the workshop programme;
  - Sharing experience and lessons learnt from previous workshops;
  - Broadcasting the conclusions from the workshops and providing additional help to workshop organisation upon request.

ECHA provided support for dozens of workshops held in 2018 and similar support will continue in 2019.

- **Facilitating the use of data available** through regulatory processes (CLP, authorisation, restriction and Biocides dossiers) to support substitution.
- **Facilitating support to innovation.** ECHA lists potential funding schemes<sup>18</sup> at the Member State level. In collaboration with the European directorate for research and innovation. ECHA is also working to define how the future Horizon Europe R&D (which will succeed Horizon 2020) programme can support substitution.

Substitution has already been supported by European financial support to R&D (Horizon 2020/7<sup>th</sup> framework programme/ERC funded projects). Examples are presented on [CORDIS portal using the key work “SVHC”](#).

- **Networking.** ECHA has created two networks to discuss analysis of alternatives and substitution: a LinkedIn Substitution group, and NeRSAP (Network of REACH SEA ad Analysis of Alternatives Practitioners).

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<sup>18</sup> <https://echa.europa.eu/fr/funding-and-technical-support>

## V.2. The Dutch case

### V.2.1. ORGANISATION

- **The Ministry of Infrastructure and Water Management (I&W)** is the ministry in charge of the environment policy in the Netherlands. The chemicals policy unit oversees REACH and POP regulations. The unit is also in charge of the strategy to substitute hazardous chemicals, in partnership with the Ministry of economic affairs, research and innovation centres and industry. Most of the work of the chemicals policy unit is regulatory. Although growing, substitution is currently a rather small component of its workload, two persons currently work part-time on substitution issues at the Ministry.
- **RIVM**, the Dutch Environmental Agency, conducts some technical work to support the Ministry of infrastructure and water management in its tasks, including substitution-related topics.
- **The Ministry of economic affairs** oversees the definition of the R&D policy. They collaborate with the Ministry of infrastructure and water management on the substitution of hazardous chemicals.

Since 2011 the Dutch government has collaborated with entrepreneurs and researchers to specifically strengthen 9 top sectors by focusing public support to private R&D and to research institutes. These sectors are listed below.

- Horticulture and propagation materials
- Agri-food
- Water
- Life sciences and health
- Chemicals
- High tech
- Energy
- Logistics
- Creative industry

These areas/sectors are critically important for the Dutch economy, and the government wants to develop a coherent agenda to stimulate relevant innovation, creativity and entrepreneurship in the Netherlands. This broad initiative is called the 'Knowledge and Innovation Agenda': These top sectors also influence the agenda for public research.

For each sector, so-called "top teams" composed of high-level representatives from industry, public research and government draft knowledge and innovation agendas which they submit to the government for consideration. The government then evaluates each top team's proposed agenda, which includes a strategic plan and recommended support instruments relevant to each top sector. Collaborations and sectorial plans are then formalised in the top consortia for knowledge and innovation (TKIs) of which some top sectors have more than one.

The policy officer in charge of substitution at I&W is responsible for the following tasks:

- **Commissioning and assisting with the development of the Safe Chemicals Innovation Agenda (SCIA)**
- **Presenting the SCIA and the Dutch strategy at relevant events**
- **Organizing substitution workshops.** Consistent with the ECHA strategy, the workshops aim at providing solutions on specific topics as well as testing how the substitution process can be facilitated. One substitution workshop on anti-fouling products for ships (copper-based paints) was held in 2018. This fits in the ECHA strategy: a report on the workshop will be uploaded soon on the ECHA website.
- **Maintaining contact with Dutch research institutes to see how they can work on the SCIA themes**

## V.2.2. STRATEGY FOR SUBSTITUTION

### V.2.2.1. Strategy

Currently there is **no roadmap or formal strategy transversally tackling all instruments contributing to the substitution of hazardous chemicals**, but the **Safe Chemicals Innovation Agenda work on the innovation part of the substitution strategy**.

In 2017, the Ministry of Infrastructure and Water Management (I&W) determined that there was no clear agenda regarding substitution and related R&D. Consequently, it launched a study to the Safe Chemicals Innovation Agenda (SCIA). The SCIA stresses the concept of “safe by design”, with an emphasis on functional substitution rather than drop-in substitution, due to the risk of regrettable substitution.

Released in 2018, the SCIA is envisaged as a framework/menu for substitution projects. The Agenda defines **a list of priority themes for R&D and innovation in related to substitution and reduction of the use of hazardous chemicals. Innovation projects related to SCIA themes will be compiled and presented as part of regular monitoring reports.**

I&W elected to incorporate SCIA themes into existing relevant programmes, rather than building a dedicated SCIA framework. Indeed, I&W believes that the latter would be difficult to implement in the Netherlands because: 1) competition for resources in innovation policy 2) the general perception that substitution restricts innovation rather than as a catalyst that motivates some stakeholders to innovate. Including dedicated subjects in existing programmes is perceived as feasible and more likely to be supported by relevant stakeholders.

Currently, I&W is trying to **match top sectors (of the Dutch innovation policy) with the SCIA themes**. However, discussions with the various top sectors have proven difficult because each sector has its own program with many important issues on the agenda besides substitution of hazardous chemicals. The key recommendation is to find the right timing to discuss these themes.

Building a dedicated programme/centre for substitution could be an option (Swedish option), but I&W prefers to **build on existing sectors / innovation schemes**.

At the national level, I&W is **involved in ongoing discussions with the research institutes to understand which SCIA themes they may be willing to push forward**.

This strategy is a combination of top-down and bottom up approaches:

- **Top-down approach:** themes are developed by the ministry as part of the SCI agenda and try and integrate existing programs.
- **Bottom-up approach:** research institutes come up with ideas based on their research and their discussion with industrials.

The SCIA has inspired the EU DG Research and Innovation to organize thematic working groups based on the SCIA themes to develop proposals on research and innovation.

#### V.2.2.2. Prioritisation approach

##### ZZS list

The Netherlands has defined a list of priority hazardous substances called ZZS list. This list incorporates the REACH SVHCs, as well as other hazardous substances covered by other regulations such as the Water Framework Directive. Criteria for inclusion on the ZZS list are the same as criteria for classification as SVHC (CMR, PBT, vPvB or substances of similar concern) but the list is longer than the SVHC list because classification of SVHC is not automatic.

Emissions of ZZS-list substances to water and air must be avoided or reduced. Installations subject to an environmental permit must prove they avoid or reduce emissions of substances on the ZZS list, and they must report continuous improvement, including substitution of hazardous chemicals or R&D on the subject. ZZS substances can still be used if emissions are controlled and below the limit values defined in environmental permits.

The ZZS list and recommendations for industrials are provided by RIVM. RIVM also maintains an active list of potential ZZS-list substances as they arise. There are hundreds of substances suspected of meeting the ZZS list criteria, but they have not been formally recognized. Permitting authorities can introduce limit values for potential ZZS in accordance with the precautionary principle.

##### For the Safe Chemicals Innovation Agenda

The choice was to focus the prioritisation on defining key themes or functions rather than on identifying target substances or sectors. The objective was to broaden the scope of innovation beyond drop-in substitutes.

The concept of SCIA themes/functions is mixed between final functions and chemical technical functions.

- **Final functions:** For example, the theme fire safety was selected over flame retardants to discuss fire-proofing materials, related construction techniques and flame retarding solutions. Plasticizing and grease repelling are also final functions.
- **Chemical technical functions:** In parallel, chemical technical functions can be useful when final functions are too broad to gather relevant stakeholders or when substances are used in industrial processes with no final functions (for example solvents)

The study that launched the Safe Chemicals Innovation Agenda was conducted by consultants using a combination of interviews with stakeholders (e.g., sector organisations, NGOs) and literature research.

Development of the priority themes was an iterative process based on chemicals emerging as problematic. Final prioritisation of SCIA themes was the result of a collaboration of the consultants, I&W, RIVM and research institutes.

Subjects for which the industry is volunteer to act is further prioritised in order to highlight frontrunners. The impetus to act/volunteer often comes from downstream users (e.g., Ikea, Philips).

Although there are different ongoing projects to collect more data on substitution-related topics<sup>19</sup>, it is not the intention of I&W to use these data as a basis to prioritise subjects for substitution.

### **For workshop themes**

Themes for workshops organised by the Ministry of Infrastructure and Water Management are chosen based on existing issues and opportunities.

I&W organised the workshop on anti-fouling substances because it was already engaged with stakeholders on this issue in relation with water recreation areas. They had already informed boat owners of existing alternatives. I&W initially realized that it was difficult to convince stakeholders to use alternatives which was a reason to look more closely. RIVM looked for alternatives (technical study). ECHA came up with the idea of organizing a substitution workshop, and proposed it be held in the Netherlands to capitalize on Dutch expertise in this area and on the network of Dutch companies willing to start a project on the subject.

I&W is in the early stages of developing a project related to the interface between waste and chemicals regulations and is looking for volunteers (e.g., on plastics). This subject currently has a high profile on the political agenda and there is a need to develop expertise on the matter. The Ministry would like to include the concept of safe by design within the concept of circular design (i.e., substitution at design stage) because substitution enable to prevent future issues with waste management and material recycling.

### **V.2.3. SUPPORT SCHEMES**

- Substitution workshops are organized, financed and facilitated by the Ministry of Infrastructure and Water Management. Workshops help identify solutions and enable attendees to network and disseminate these solutions. Because of limited funds, the Ministry does not intend to fund more than 2 substitution workshops per year. Follow-up actions, such as developing testing programmes for alternatives, can also be financed by the Ministry, but such decisions are made on an ad-hoc basis.
- The Ministry of infrastructure and Water management has no formal subsidy scheme for substitution.

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<sup>19</sup> inventory of chemicals of concern in waste, use maps to identify where chemicals are found, strengthening the connection between E-PRTR data (reporting of hazardous chemicals) and ZZS data, including provinces, local authorities and RIVM

- The goal would be to have projects related to the Safe Chemicals Innovation Agenda managed directly by the industry / research institutes (e.g., financing, facilitation). The ministry would remain involved help maintain project momentum and interest.
- The Ministry of economic affairs finances innovation schemes and provides subsidies. Companies can apply for funding of substitution projects, but substitution is not a priority on the agenda nor is it a selection criterion.

#### V.2.4. LESSONS LEARNT

- **Prioritization of subjects is key** considering the resource limitations of programs dealing with substitution (e.g., the Netherlands has only 2 part-time persons working on the subject,).
- **Member States should specialize in the areas of substitution in which they have the most expertise or are most relevant to their needs. They should organise workshops on these subjects and invite other Member States to participate.**
- **To prioritise key subjects, consultations with stakeholders appears to be a more effective approach compared to data source assessment, primarily due lower cost and relative efficiency.** The Netherlands experience suggests that accessing comprehensive data sources on substances, sectors, alternatives and emissions is very difficult because these data are generally not available digitally. Experience indicates that dedicated studies relying on stakeholder consultations provide similar insight on priorities at a lower cost because the priority subjects are already known to the stakeholders.
- **Workshops need to include the entire supply chain** (example of the anti-fouling project). It is key to that the whole supply chain be represented at these workshops in order to: accurately characterise the nature of the problems, understand end-user requirements, identify realistic alternatives, and develop a strategy for promoting these alternatives.
- **Workshop facilitation is key and needs to be the responsibility of a facilitation specialist.** It can be difficult to navigate between the disparate interests of stakeholders (e.g., industrials who present imperfect no-cost solutions or minimize perceived risk, and industrials who produce the alternatives). Promoting alternatives will be ineffective if current solutions are incorrectly characterized (e.g., deemed adequate when they are not). A seasoned facilitator will be able to steer discussion in the right direction (towards substitution and innovation as appropriate) and ensure that all parties remain engaged and focused on fact-based discussions.
- **Workshops should be organized in English** because most value chains are international. This has not been perceived as a problem for companies, including SMEs.
- **A combination of top-down and bottom-up approach is preferred.**  
In the Netherlands, I&W strives to advance priority themes for substitution that were established nationally in the innovation policy (top-down). The Ministry also cultivates relationships with the research institutes and industry to learn about research priorities

and emerging industry needs (bottom-up). However, final decision as to which themes receive priority is up to the research centre and the industry support schemes (bottom-up).

- **A dedicated framework to financially support substitution should not be preferred over existing bottom-up financial support schemes because it can negatively affect the visibility and efficiency of support schemes.**
- **Given that public resources to support substitution will always be finite, public authorities should focus on convincing other stakeholders to support substitution and to finance and organise the related workshops.**

## V.3. The German case

### V.3.1. ORGANISATION

In Germany, two federal institutions work on substitution from different perspectives:

- BAuA<sup>20</sup> (Federal Institute for Occupational Safety and Health)  
Concerning REACH, BAuA is the hub coordinating all activities (e.g., contact with the German Ministries and EU authorities, communication with other experts).  
BAuA works on substitution from an occupational safety and health perspective, with a focus on the regulation.
- UBA<sup>21</sup> (Federal Environment Agency)  
UBA works on substitution from an environmental perspective.

### V.3.2. STRATEGY FOR SUBSTITUTION

#### V.3.2.1. Strategy

There is no formal strategy for substitution in Germany. UBA works with ECHA on the EU substitution strategy.

#### V.3.2.2. Prioritisation approach

According to BAuA, the REACH SVHCs list can miss the real risk priorities because the list includes only priority substances established based on hazard criteria, even though some of these substances are used in closed system or in low/medium quantities.

BAuA basis its decisions for prioritisation on a qualitative approach relying on years of experience and several information sources. Expertise/experience and analysis of known risks is perceived as a good prioritisation approach to get the bigger picture on substitution priorities.

BAuA uses:

- A top-down approach to target substances-sectors that should be substituted. This helps prioritise regulatory actions, select the subjects for future workshops and define public research priorities for BAuA.
- A bottom-up approach when they advise individual companies (no prioritisation).

BAuA organises discussions based on individual substance and the relevant supply chain; this allows companies using one substance in a similar supply chain to collaborate.

BAuA focuses on hazard and risk to establish substitute priorities. There is no quantitative method based on DALY/QALY (Disability or Quality Adjusted Life Years, a measure of sanitary impacts) for example.

BAuA uses the following data sources to inform its work (most are publicly available):

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<sup>20</sup> Bundesanstalt für Arbeitsschutz und Arbeitsmedizin.

<sup>21</sup> Umweltbundesamt.

- Occupational health statistics for Germany (number of people exposed to a substance or hazard)
- Sectors and the substances used in each (national and EU statistics)
- Quantities of substances used (national and EU statistics)
- Information about the use (e.g., open or closed system)
- Case studies of illnesses
- SUMER survey 2010 (France) – list of carcinogenic substances in the workplace to which people are exposed <sup>22</sup>
- Literature

UBA has adopted a holistic approach to substitution. In addition to hazard and risk issues, it also considers other environmental factors and impacts (e.g., to natural resources, Global Warming Potential) in their work. However, these considerations do not generally rise to the level of a comprehensive life-cycle analysis (LCA).

UBA uses the GSBL ([https://www.gsbl.de/eng\\_home.htm](https://www.gsbl.de/eng_home.htm)) database to identify substance hazards.

### V.3.3. SUPPORT SCHEMES

#### V.3.3.1. Technical support and networking

BAuA provides technical and networking support as follows:

- It organises one workshop per year on substitution<sup>23</sup>. The aims of the workshop are the following:
  - Provide opportunities for networking
  - Present BAuA's research to stakeholders
  - Provide a forum for alternative providers (substances or technologies) to make presentations to other stakeholders
  - Provide an opportunity for companies using alternatives to share their experiences. Note, finding companies that have already implemented substitution and are willing to share their experiences may be challenging because many companies active in substitution are reluctant to share their knowledge for fear of losing any competitive advantage they gained from substitution.

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<sup>22</sup><https://travail-emploi.gouv.fr/IMG/pdf/2013-054-2.pdf>

<sup>23</sup> The next one will be about Cr(VI) in January 2019.

<https://www.baua.de/DE/Angebote/Veranstaltungen/Termine/2019/01.14-REACH.html>

- It conducts studies to stimulate substitution<sup>24</sup>. The objective of these studies is to provide an independent view on technical and economic feasibility. Experience suggests that industry often claims that substitution is not feasible, without first conducting a thorough analysis of the opportunities and challenges.
- Provides information about substitution (database...)

BAuA has the equivalence of 1 to 1.5 full-time staff (full-time equivalents or FTEs) devoted to substitution-related work.

UBA also supports substitution through the following guidance documents/tools:

- Guide on sustainable chemicals - A decision tool for substance manufacturers, formulators and end users of chemicals (<https://www.umweltbundesamt.de/publikationen/guide-on-sustainable-chemicals>)
- Tools (<https://www.umweltbundesamt.de/dokument/subselect-instrument-zur-auswahl-nachhaltiger>)
- Summaries of Pilot projects (<https://www.umweltbundesamt.de/themen/chemikalien/chemikalien-management/nachhaltige-chemie/chemikalienleasing/chemikalienleasing-in-der-praxis#textpart-2>)

The research projects do not focus on specific companies, sectors or substances.

Depending on project need, the UBA chemical department has 15 professionals who have expertise to work on a substitution project and partly devoted to substitution<sup>25</sup>.

#### V.3.3.2. Financial support

Financial support for substitution is provided by different ministries (economy, environment, science). However, none of this support is earmarked specifically for substitution projects. Moreover, BAuA does not know to which extent any of these programmes support substitution.

BAuA does not have a budget to support companies financially but it does finance public research on substitution. The results of these studies are publicly available. UBA does not provide any financial support.

#### V.3.4. LESSONS LEARNT

Substitution should be informed by science and it should be prioritised by adopting a **holistic approach**:

- **All substances should be considered, even substances that are not SVHCs or that are not in the scope of REACH** (pesticides, biocides). The SUMER project has shown that SVHCs play

<sup>24</sup> Example : Research on the Technical Feasibility and Cost Effectiveness of the Application of Chromium (VI) Compounds in the Application Areas of Electroplating, Coil Coating, Wood Protection, or as Pigments (January 2011), study available upon request

<sup>25</sup> There are 30 people the chemical department.

a minor role among carcinogens of concern in the workplace whereas mineral oil, silica dust, asbestos and general dust are of higher concern.

- **All endpoints should be considered to prioritise subjects** (all human health and environmental impacts, including sensitizers). Besides hazard and risk, other environmental impacts (e.g., natural resources, global warming potential...) should also be considered.
- **Prioritisation should not focus on individual substances but rather on the functions or sectors** where hazardous chemicals are used. Functions or sectors where substances affect different groups of people are relevant subjects to heighten public awareness of a certain hazard. Substitution of hazardous substances used in pest control (affecting farmers, the environment and consumers) and substitution of hazardous chemicals used in textiles (affecting workers, consumers and the recycling chain) are good examples of this concept.
- **More data need to be collected in order to improve substitution.** It is difficult to collect information on hazards, risks and environmental impact along the whole value chain due to confidentiality issues.
- **For workplace risks, public authorities should focus their efforts on risk minimization and management measures because these generally provide more risk mitigation potential than substitution.**
- We should look at **substitution as a long-term challenge, i.e.**, if substitution is not possible today, we should develop **the conditions and appropriate the necessary resources to achieve it in the future.**

## V.4. The French case

### V.4.1. ORGANISATION

The French organisations involved with substitution of chemicals is extensive and warrants a dedicated study. For the needs of this study, we limited our analysis to a few institutions who currently play a big role around chemicals substitution.

In France, four ministries - Labour, Health, Economy and Environment – are involved in substitution. Each has one directorate - Directorate General for Labour (DGT), Directorate General for Health (DGS), Directorate General for Competition, Consumer Affairs and Fraud Control (DGCCRF), and Directorate General for Risk Prevention (DGPR) – that may require expert opinions and actions on projects related to substitution. The following three national organisations typically provide the required expertise and related resources: ANSES, INERIS and INRS.

#### **ANSES**

The Agency for Food, Environmental and Occupational Health & Safety (ANSES) is responsible for monitoring, expert assessment, research and reference activities covering a broad range of topics related to human health, animal health and well-being and plant health. The Agency also assesses the effectiveness and risks of veterinary medicinal products, plant protection products, fertilisers, growing media and their related adjuvants, as well as biocides, in conjunction with its formal issuance of marketing authorisations for these products. It also provides assessments of chemicals within the framework of the European REACH regulations.

Key ANSES duties include environmental and workplace risk assessment to assist public authorities, expert assessment and scientific and technical support necessary for the drafting of laws and regulations and implementing risk management measures.

ANSES defines, implements and funds scientific and technical research programmes. It participates in work undertaken by European and international bodies and represents France at the request of the Government.

#### **INERIS**

The French national institute for industrial environment and risks (INERIS) was created by the Ministry of the Environment in the 1990s. Its research activities support public policy, and its services support businesses and contribute to assessment and prevention of risks (to the environment and human health/safety) caused by economic activities. INERIS develops scientific and technical competencies in the areas of accidental risks, chronic risks, and ground and underground risks. The Institute supports innovation by anticipating the risks linked to new products, new technologies or processes. INERIS has 30,000 m<sup>2</sup> of laboratories and testing centres space, but it also a strong partnership with national laboratories and institutes, international organisations and agencies, and with national 'Alliances' (described below).

## INRS

The French National Research and Safety Institute for the Prevention of Occupational Accidents and Diseases (INRS) is a non-profit organisation, subject to State financial oversight. It was created in 1947 under the aegis of Social Security. Its activities are programmed in accordance with directives from Social Security (French National Health Insurance Fund for Salaried Workers - CNAMTS) and policies defined by the Ministry in charge of Labour. INRS's goal is to contribute to prevention of occupational accidents and diseases through a set of four complementary actions. It conducts studies and research in a variety of areas, offers a wide range of training activities, develops and disseminates information on occupational safety and health, and provides technical, legal, medical and documentary expertise.

A fifth governing ministry (Research and Higher education) supported by the **National Agency of Research (ANR)** could become more deeply involved in substitution in the future. ANR defines priorities for public research. Universities and public institutes can apply for funding to pursue research programmes that are ANR priorities.

## V.4.2. STRATEGY FOR SUBSTITUTION

### V.4.2.1. Strategy

There is no formal strategy for substitution, but several related initiatives warrant discussion.

#### **An obligation to substitute CMR 1A and 1B in the workplace**

Employers in France are obligated to identify substitutes for Category 1A or 1B CMRs substances in the workplace as part of the general principles for prevention contained in the Labour Code). The employer must be able to justify all successful or unsuccessful efforts made with the purpose of substituting these agents or processes identified in the workplace. The outcome of these investigations must appear in a risk assessment document. Non-substitution by a non-hazardous or less hazardous substance or process can only be justified by substantial technical justification. When substitution is not feasible, the employer must implement all possible measures to reduce exposure by means of suitable prevention and protection measures (closed systems, other collective protection measures, followed by personal protection measures but also training and dissemination of information to employees, as well as medical monitoring).

#### **Project CMR substitution**

ANSES was commissioned in 2006 by the French Ministry of Labour to conduct a study and develop a tool to support substitution of chemicals classified as CMR 1 or/and 2. Since then, the Agency has been working on substitution by proposing an open-access national reference platform - [www.substitution-cmr.fr](http://www.substitution-cmr.fr) - listing the available data and field experiences along with the relevant regulatory and bibliographical reference data.

ANSES convened a multidisciplinary working group "CMR substitution" to collect data about CMR properties, uses and alternatives.

ANES has also executed agreements with several institutes on this topic, including the French National Health Insurance Fund for Salaried Employees (CNAMTS).

A key limitation of the CMR substitution project is that data collection is based on the voluntary participation of stakeholders. Furthermore, ANSES can only provide general comment on human health risks of the identified alternative, i.e., they cannot delve into a comprehensive risk assessment of alternatives.

### **Working group on formaldehydes and substitutes**

Aware of the limitations imposed on ANSES's ability to analyse alternatives, in 2014, the Directorate General for Labour (DGT), the Directorate General for Health (DGS), the Directorate General for Competition, Consumer Affairs and Fraud Control (DGCCRF), and the Directorate General for Risk Prevention (DGPR) formally request that ANSES provide the public authorities with an expert opinion on the use of substitutes for formaldehyde in various sectors where it is used.

In order to obtain a comprehensive, independent and multidisciplinary expertise, ANSES assigned this task to the Working Group "Formaldehyde and substitutes" under the supervision of the Expert Committee (CES) on "Characterisation of substance hazards and toxicity reference values".

Before specifically address the issues and questions concerning formaldehyde, ANSES decided to first develop a method to compare and assess substitutes. It reviewed the scientific literature on the subject to define a working method that could be applied to formaldehyde and that could serve as a template for substitution of other hazardous substances used in other fields of application.

The result is a method assessing many criteria and guiding the user through the various steps.

### **French guidance on substitution**

In 2016, the Director General for Risk Prevention (DGPR) of the French Ministry for the Ecological and Inclusive Transition sent an engagement letter to the INERIS (representing research) and MEDEF (representing companies), asking them to form a working group to create a methodology and guidance document for assessing substitution solutions.

An ad-hoc working group was created based on a call to the members of the French Health and Environment Group. The working group, consisting of industry representatives, stakeholders in civil society, public authorities and experts, met several times till June 2017. In September 2017, the "**Practical Methodological Guide for Assessing Substitution Solutions**" was published. This guide is intended to help substitute once substitution has been decided. It will not be useful for examining the reasons for initiating a substitution process for a specific substance. This guide on chemical substitution is **intended to guide businesses, public authorities and other stakeholders compare different potential alternatives and chose a substitute**. Based on documentation that provides an overview of the substitution approaches suggested by international bodies<sup>26</sup>, it aims to go above and beyond existing processes by developing a notion of functionality associated with the use of a substance, by providing methods of assessing hazards that have not yet been classified, by expanding the list of

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<sup>26</sup> The main documents are available at <https://substitution.ineris.fr/fr/documentation-gt-substitution>

criteria to be considered in determining the correctness of a choice and by suggesting organisational elements to steer the process within the entity implementing it. To ensure complementarity and coherence in the expert guidance they provide, the INERIS/MEDEF operating guide, ANSES (which developed a method for comparing alternatives as part of a case on formaldehyde), the German company Ökopol (which presented a guide on the sustainable use of chemicals created by the Germany Environmental Agency), and "Substool," (tool for assisting with substitution) have formed a working group.

## SNPE2

France adopted a proactive approach to drafting the second **National Strategy on Endocrine Disruptors**, which is a very active subject within the European Union. The project has been drafted under the joint oversight of the Ministries for Solidarity and Health and the Ecological and Inclusive Transition. Via Actions 36 and 37 of its draft strategy currently under public consultation, French government wants to mobilize the companies involved with innovative approaches in technology, organisation and service around the substitution of the endocrine disruptors (EDs) and the promotion of this substitution.

The stated priority for this strategy is to reduce the human and environmental exposure to the endocrine disruptors and the economic actors have a key role to play in advancing this initiative on. Substitution can represent a competitive advance by making it possible for companies to anticipate regulations and develop their products more efficiently and sustainably. After they identify the challenges with past calls for substitution projects, the French government will **launch calls for projects that create a new dynamism around substitution** (ADEME, pole of competitiveness, plan investment with a future...).

As part of this strategy, ADEME, INERIS and ANSES will **launch Theses on ED substitution**.

### V.4.2.2. Prioritisation approach

#### CMR substitution

The first step in ANSES' work consisted of developing a national priority list based on the new prioritization methodology and selection criteria contained in the SIRIS method (System of Integration of Risk with Interaction of Scores). **A preliminary list of priority substances** was developed based on **toxicity** (CMR classification), **the quantities used, and the number of workers potentially exposed in France**, ANSES hired several consultants to work on identifying the supply chains using or producing these substances.

ANSES approach consisted of the following steps:

- create a multidisciplinary committee consisting of scientific experts with specialized expertise in the substances and the sectors of concern, and of generalists who can step away from the sectorial issues,
- review of the existing regulations,
- conduct stakeholder surveys,

- conduct stakeholders' interviews,
- conduct a public consultation,
- conduct restitution meetings when possible.

About 400 industrials using or having used one or more of the 23 priority substances have completed a questionnaire to collect data on CMR use.

### INERIS/MEDEF Substitution Guidance

INERIS has worked on a complementary approach by applying the methodology used for the PNSE (National Plan for Health and the Environment) to classify priority substances<sup>27</sup>, and calculating a collective risk index to develop a "**collective risk indicator**" for 319 substances, based on public health data. Collective risk is defined as a product of the **magnitude of the exposed population** (PExp) multiplied by the **estimated risk** (the sum of the ratios (exposure by inhalation/toxic dose by inhalation), same for ingestion).

Ranking substances of concern according to public health data implies a focus on collective risk, measured by the number of deaths and/or diseases attributable to a specific substance. However, **collective risk data are only available for very few substances**. Consequently, the guidance developed an indicator to estimate this collective risk indicator (CRI). CRI is based on the risk indicator used by Eurostat to monitor the effectiveness of the implementation of the REACH Regulation, adapted to the specific context of the PNSE3. The CRI construction method and the practical details of each step were reviewed in a participatory approach that included experts in risk and members of civil society. A CRI was calculated for more than 300 substances. The results provided the following benefits:

- a) For the first time in France, development of a prioritized list of substances based on a simplified construction of collective risks;
- b) Preliminary classification of approximately 50 substances on the list, as substances of the greatest concern.

As part of the procedure for preparing the PNSE3, **a multicriteria analysis allowed the working group to generate different substance rankings**. The CRI prioritized list formalizes a public health-based rationale and provides useful information for decision makers.

This method and the CMR method have similar approaches, but the final ranking may vary between the two, and the exposure values used in the INERIS/MEDEF guidance are specific to France.

### SNPE2 (National Strategy for Endocrine Disruptors)

The first action described in the draft French strategy currently under public consultation is to develop a **list of the chemical substances which are potential endocrine disruptors to achieve better risk management**.

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<sup>27</sup> ["Aide au choix des substances prioritaires du futur plan national santé environnement : Elaboration et Mise en œuvre d'un indicateur de risque collectif." *Environnement Risques et santé*, volume 13 n°3 Mai Juin 2014.]

In collaboration with other French organisations, ANSES and INERIS will compile lists of ED substances in cosmetics, health products and phytopharmaceuticals. Recommendations of possible regulatory measurements under the sectoral regulations and REACH in 2019 will be part of this process. Then a robust and shared (with others Member States) method to prioritise endocrine disruptors should be defined, in order to draw up a ranked list of these substances which will be shared to determine 3 categories of EDs (proven, supposed, suspected) to human and the environment.

### **Prioritisation of public R&D in National Research Agency (ANR) programme**

There are five 'Alliances' created<sup>28</sup> within the framework of launching the National strategy for research and innovation (SNRI).

- AVIESAN, National alliance for the health and life sciences;
- ANCRE, National alliance of coordination of research for energy;
- ALLISTENE, Alliance of sciences and technologies of digital;
- AllEnvi, National alliance of research for the environment;
- ATHENA, National alliance of the social sciences.

The strategy identified three priority axes of development: (1) health, the wellness, food and biotechnologies; (2) environmental and ecotechnologies; (3) information, the communication and the nanotechnologies:

Alliance members are publicly funded as they are French institutes, laboratories, organisations, and universities.

The Alliances help the National Agency of Research (ANR) build its programme and **coordinate the priorities of the research and the development** in conjunction with the associated sectors, thanks to the development of scientific and technical roadmaps. They also build partnerships with the companies in the economic sectors concerned.

Competitiveness clusters coordinate with each other and with associated alliances, by sector to build coherent strategies towards research and innovation.

**Therefore, Alliances could help to identify and prioritise substitution activities.**

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<sup>28</sup>[http://cache.media.enseignementsup-recherche.gouv.fr/file/2010/84/2/5\\_alliances\\_pourameliorer\\_la\\_reactivite\\_du\\_systeme\\_147842.pdf](http://cache.media.enseignementsup-recherche.gouv.fr/file/2010/84/2/5_alliances_pourameliorer_la_reactivite_du_systeme_147842.pdf)

### V.4.3. SUPPORT SCHEMES

#### V.4.3.1. Technical support

Projects conducted by ANSES, INERIS and INRS provide some technical support to the employers that are the target CMR (formaldehyde in particular), and SVHC substitute initiatives<sup>29</sup>.

#### V.4.3.2. Public research

Public R&D related to sustainability is qualified to contribute to substitution well ahead of the actual substitution process because public R&D can anticipate research ahead of actual market needs.

#### SNPE2

An innovation competition (PIA) and theses funded by ADEME will contribute to the strategy for substitution and promotion of substitution of endocrine disruptors.

#### ANR

The agency helps prioritise research themes, but its financial support is essentially bottom-up.

The funding instruments offered by ANR for its work programme<sup>30</sup> have their individual specific purposes, anticipated effects and unique selection criteria. There are **collaborative research instruments** and **instruments for individual R&D**. When submitting a project, researchers must choose the funding instrument that will best serve the scientific objectives and requirements of their project.

Project scoring has four components, and **component 4 “Economic impact of research and competitiveness”** requires that projects develop partnerships with enterprises and transfer the findings from public research to the business community.

A key goal of the proposed initiatives is to **boost cooperation and partnerships, creating value from the results of public research**. These are also designed encourage company R&D efforts by providing incentives to innovate. These initiatives are positioned to elevate technological maturity of companies/sectors and promote greater integration of these inter-sector partnerships. Due to difficulties in forging links with the public research sector, relatively few SMEs and middle-market companies in France offer innovations in services or products. **Some initiatives should target these SMEs and middle-market companies.**

French companies can apply for funding via **interministerial calls for projects** aimed at **supporting collaborative approaches between research and industrial users**. **In 2018, a project about Cr(VI)**

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<sup>29</sup> INERIS SNA Substitution: <https://substitution.ineris.fr/fr>

ANSES CMR Substitution: <https://www.substitution-cmr.fr/>

INRS FAS (Substitution Fact Sheet): <http://www.inrs.fr/media.html?refINRS=FAS%200>

<sup>30</sup> <http://www.agence-nationale-recherche.fr/fileadmin/documents/2017/ANR-Work-Programme-2018.pdf>

**substitution in the aeronautic area was selected and the entire supply chain** is involved. The expertise of the French competent authority on REACH regulation has been requested to assess the relevance of financing such projects.

#### V.4.3.3. Example of the Carnot institute: a public-private partnership

The Carnot institute <sup>31</sup> is a label existing public laboratories or institutes can obtain if they meet the criteria <sup>32</sup>. The network comprises 38 entities in France today. It combines scientific excellence with professionalism and is committed to developing research to fuel corporate innovation. The network represents 18% of the French public laboratory workforce and 50% of the privately-funded R&D in public institutes and universities.

The founding purpose of the Carnot institutes is **to bring public research and industry together** to respond to the corporate need for innovation. This approach stimulates their research activities and supports their competitiveness. Companies of all sizes can seek support for their projects. Public sector clients (e.g., local governments, agencies.) can benefit from the institutes' R&D skills. Thanks to the broad range of scientific fields (e.g., electronic, energy, environment, health) covered by the Carnot network, they can serve all business sectors.

Each year, over 11,000 direct R&D contracts are signed between Carnot institutes and the industry. This does not include the large number of joint participation efforts in collaborative R&D projects (national and as part of European Framework Programmes). Half of projects are financed by government, around 27% by individual companies, and the rest are collaborative projects jointly financed by public and private. Projects are proposed via a **bottom-up approach**.

#### Example of collaborative project

A good example is the [ongoing project on sol-gel anti-corrosion coating](#) technology designed to substitute chrome VI. This project is being supported by CIRIMAT (Institute Carnot). Liebherr Aerospace, Ratier-Figeac, Safran Landing Systems, Mapaero, CIRON SA, and Mécaprotec Industries. The industries have already benefited from [CIRIMAT expertise used to develop a Zinc Nickel](#) electroplating solution to substitute cadmium in anti-corrosion treatment of metallic articles. **This kind of collaborative R&D project can be conducted jointly because the innovation by itself would provide no competitive advantage for any of these companies.**

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<sup>31</sup> <https://www.instituts-carnot.eu/fr>

<sup>32</sup> <https://www.instituts-carnot.eu/fr/le-label-carnot>

#### V.4.4. LESSONS LEARNT

- Substitution projects require compilation and evaluation of **large quantities of highly technical data related to a** specific application. Different sources of **information exist** (e.g., workshops, different REACH processes) and accessing these data can be difficult, especially if they are not available digitally. ECHA could work to provide ready access of the requisite technical information to all parties.
- Whether MS officers in charge of assessments and ECHA officers, it is impossible for anyone to be experts on each SVHC and their possible alternatives. Hence, they could be helped in this task by a network of experts on various subjects. France would promote **creation of a network of experts for each substance/each use**. Experts would originate **from different parties** (industry, NGOs, universities...) and **different countries**. These experts could be contacted when necessary.
- The organisation of **workshops with various experts and focused on particular uses of substances** would help the work of the experts and would increase their expertise.
- Even though we generally ‘work better in numbers’, it is important to **be aware about the limits** of this expression. The workability and the efficiency of **collaborative projects** seem to be limited **when the subject is too close to the final market**. A consulted officer was going so far as saying that it may be **counterproductive, slowing down the process in the interest of the whole group**. The other risk that must be considered is that members of the consortium can **keep their best forces and elements to serve their individual R&D**, appointing the rest for the joint research.
- In order to **create collective asset in a project with competitive edge**, the solution is to **finance independent (publicly financed) research** on the project, serving thus the biggest numbers of actors. Interviewed people from the domain unanimously say that **a scientific researcher truly innovates if important staff, technical and funding resources** are offered, as well as **prestige**.

## V.5. The Swedish case

### V.5.1. ORGANISATION

- **The Chemical inspectorate (Swedish Chemicals Agency)** is the competent authority for REACH. Their focus is on compliance. They carry out inspections.
- **RISE is a network of independent research institutes**, partially or totally owned by State. The recently launched substitution centre is part of RISE.
- **Chemsec is a Swedish-based environmental NGO** that aims to achieve a non-toxic environment. It is funded mainly by the Swedish government, but also by international, European and private foundations. The board of Chemsec includes 4 NGOs including WWF Sweden and Friends of the Earth. Funders (including Sweden) do not decide Chemsec activities. Chemsec works internationally with a focus on European policy and stakeholders. They provide tools and resources to public authorities and industry alike. **Swedish initiatives towards substitution** (notably the substitution centre) **are independent from Chemsec work.**

### V.5.2. STRATEGY FOR SUBSTITUTION – THE SUBSTITUTION CENTRE

#### V.5.2.1. Strategy

A non-toxic environment is a key goal of the Swedish government. In 2017 the government led a comprehensive investigation to describe the needs of companies to increase substitution (3 persons involved, for at least half a year).

A key priority need identified by this research was the need for better information around substitution in order to increase the knowledge-base in the affected sectors. Companies that are not familiar with substitution (e.g., SMEs, downstream users) need assistance to understand risks, challenges and benefits of pursuing substitution. There is also a need to help people inside companies justify substitution to their managers.

Expertise around environmental chemistry (e.g.,) is a key gap in most small companies. Important decisions in the manufacturing process, such as product and process design, are generally the responsibility of material engineers, chemists, process engineers who have little knowledge of impacts on human health and the environment. Downstream users also do not have the requisite chemical competence.

Despite these issues, the chemical inspectorate (public authorities) cannot currently recommend approaches to advance substitution because this falls outside their defined mission and competency. They can only advise on compliance, i.e., they can tell companies that they are doing something wrong but cannot advise them on how to fix it.

Consequently, the mission to encourage substitution was granted to RISE, because they do not have the same restrictions on competencies and their research and development work already helps companies with chemical issues, substitution and sustainability.

[www.substitutionscentrum.se](http://www.substitutionscentrum.se)

The centre was conceived in 2018. It currently has 3.5 employees: 1 manager, 1 communicator and 1.5 adviser positions. The plan is to add another full-time advisor soon.

The board (9 members, from industry and public authorities) will decide on the proposed strategy and substitution action plan beginning of 2019.

The agency's budget for 2018 was 5 million Swedish crowns (500 k€). The budget for 2019 is 7 million Swedish crowns in 2019 (700 k€). An additional budget of 5 million crowns (500 k€) is available to build internal competence internally at RISE and to test ideas. Funding for the centre is secure until 2022, after which the government wishes it to become financially independent, i.e., funded through memberships, collaborations, etc.

The centre is required to document the results they have achieved, which could be difficult because companies who receive help may not necessarily want to communicate the results/benefits back to the centre (confidentiality and limited resources may exacerbate this tendency).

The mission of the centre is to **increase and spread knowledge about substitution, and to advocate for its use**. The priority is to reach beyond frontrunners and large production companies that are already involved in substitution. SMEs and downstream users are focus of the substitution centre. The preparatory study for the centre indicates that SMEs and downstream users are not sufficiently informed by the trade organizations and they should be prioritised for assistance by the centre, along with the public sector, which can influence substitution via public purchasing policies.

The centre wishes to encourage non-chemical solutions (functional substitution).

Its political priorities are consumer products (especially for children) and enhancing the relationship between substitution and circular economy.

Key centre activities that are envisaged are the following:

- **Communicate about substitution** – advocate for substitution, spread good practices, describe how it can be implemented, increase awareness about regrettable substitution.
- **Networking at the technical level** (inside and outside of RISE) – The objective is to build a hub of competence and experience that can provide readily available information and assistance to companies in order to advance a technical issue ((e.g., PVC, chromate).
- **Networking at the public policy level**, including participation in international events and in the ECHA substitution network.
- **Education:** courses, lectures, workshops for different targets groups (something a lot of companies ask for). The aim is also to advocate for increasing the importance of environmental chemistry in traditional university courses.
- **Guidance:** a helpdesk that can answer questions (for free) and suggest additional resources for obtaining additional support (e.g., where to find alternatives, competence, finance, collaboration), advise on ways to avoid regrettable substitution and ensure desirable substitution. The centre could also keep a positive list of substances that could be considered as alternatives.

- **Bringing companies together to build collaborative projects:** if the centre realises that many SMEs pose questions that cover the same subjects, the centre could suggest collaboration.
- **Building methodologies to help companies**
  - Implement criteria in the purchasing standards (for downstream users) and systematically follow up on criteria
  - Inventory substances used and spot those that should/must be substituted.
  - Build a check list of the holistic criteria that a relevant for assessing alternatives and avoiding regrettable substitution. Companies understand that many factors must be considered in substitution decision-making.

The centre will work on increasing its visibility to the different organizations in charge of support for innovation so that companies applying for a support can be redirected to the substitution centre for additional information and networking opportunities. The centre will need to collaborate with other organisations (authorities and trade organizations) who also answer questions on REACH/substitution so that each organisation can clearly define and understand their respective roles.

The substitution centre will not provide financial support to individual companies, lead research or define companies' strategies.

The centre highlighted that its activities are still in the scoping phase and they have not yet been tested in practice. Although its proposed activities result from clear identification of industry needs, there is no guarantee these will work as planned or that they will be cost-efficient. This will need to be assessed once the centre has active projects.

In terms of the skills of its personnel, strategic and analytical skills (addressing the problem and how to find a solution) are important. Political or technical skills can be equally relevant for the centre, the detailed technical expertise will anyway rely on experts and will not be part of the "nod" of the centre. Educational skills are also important: employees need to be able to give presentations to both highly a specialized (e.g., scientific or technical) and a non-specialize audience.

#### V.5.2.2. Prioritisation approach

Activities of the substitution centre continue to be prioritized based on the needs of the industry, societal expectations and political priorities (listed above).

The centre's intention is to **first build priorities based on expertise rather than on a structured methodology**: RISE and the network built by the centre will be consulted as needed. In particular, the companies that sell chemical management programs are aware of their clients' issues and needs regarding substitution, and, therefore, are very important in the process of identifying priority topics. Producers of alternatives will also be contacted to understand the gaps in the substitution process

(e.g., why is it sometimes difficult for better alternatives to find the way down the supply chain? Can the centre help in some way-?).

**Finding criteria and methods to prioritize will come as a second stage.** This work has started but different approaches are likely to be tested.

### V.5.3. STRATEGY FOR SUBSTITUTION – CHEMSEC

#### V.5.3.1. Strategy

Substitution is at the core of Chemsec's missions. Chemsec activities are organised around 3 missions:

- Policy work: Chemsec studies how REACH is implemented and the extent to which it protects human health and the environment. Chemsec provides recommendations and advocates for improved implementation.
- Tools: Chemsec produces and disseminates tools to help companies substitute hazardous chemicals.
- Relations with business and investors: Chemsec encourages industry to substitute by organizing collaborative workshops where Chemsec provides insight regarding the methods necessary to implement substitution, as well as current information about what is happening at a policy level. Chemsec works with companies that are relatively advanced in regarding substitution and who are motivated to improve the way they deal with hazardous chemicals.

Chemsec's team comprises of 10 scientists and policy makers.

Chemsec focuses on raising awareness and strengthening its tools (see data sources), rather than on developing new tools or databases.

#### V.5.3.2. Prioritisation approach

Prioritisation consists of developing a list of priority substances, the SIN list. The list has been built based on the hazard criterion only. For Chemsec, it is up to companies to prioritize within the SIN list based on their use and associated risks.

The SIN list was later reorganized as SIN group because a list of 900 substances was considered overwhelming by companies attempting to build actions plans. In order to communicate and raise awareness, grouping had to be conducted. SIN groups are functional groups of chemicals. The main advantage of working with functional groups is to raise awareness regarding regrettable substitution. Substitution within the same functional group is likely to bring similar hazards (as highlighted by the SINmilarity tool – see data sources). This approach was preferred over a grouping by sector because the number of substances used by one sector can be very large and may encompass many unrelated issues.

Chemsec has developed a focus on the textile sector by a specific textile-sector guide. This was motivated by the industry itself, following the creation of a working group (Zero discharge) by the brand owners themselves. The working group pressured suppliers to provide textiles free of hazardous substances. Chemsec realized they could have a positive influence on this sector (textile producers),

particularly on SMEs where there was a need for support. The textile guide has travelled the world since and been used in major textile producing countries, including the US and China...

#### V.5.4. LESSONS LEARNT

- **It is important to tackle substitution early in the process, i.e., once hazards have been identified or once a substance is on the candidate list.** When a substance is subject to authorization it is already too late to start R&D, and haste can lead to regrettable substitution.
- **Collaboration between companies on their way to substitution is generally positive, but it should remain up to companies to decide what information they are willing to share and the areas in which they desire collaboration.**
- **Companies collaborate little on R&D. It would be valuable to have public authorities stimulate collaborative R&D albeit not ignore the fact that both individual and collaborative R&D are needed:**
  - Collaboration can be successful. For instance, the textile companies have worked together as part of the Zero Discharge strategy. The POPFREE project is tackling substitution of PFAS. Research is conducted by RISE and financed partly by companies and the State. Many SMEs working in different areas and a few chemical suppliers work together to find new solutions. For example, companies in the outdoor sector have tried to find good alternatives to PFAS-coated waterproof membranes. They gain more from working together to find solutions than by competing.
  - Individual research is key when substitution is a competition challenge, and companies must be rewarded for their investment.

In summary, collaboration is better when substitution is key for the sector and it is not a competitive issue. Individual substitution projects are preferable when finding an alternative solution provides a significant competitive edge for individual companies.

- **Public authorities should create a climate of trust with the industry,** so that companies can present their difficulties and success stories, rather than having the public authorities explain/mandate what must be done and applying pressure to implement. Public authorities should present substitution as an opportunity for the regulated community/industry (pick on).
- **Professional facilitation is needed to organize workshops.**
- **The priority needs of the industry are the following:**
  - Highlight why substitution has a positive effect on society and industry competitiveness;
  - Increased knowledge about substitution and how to implement it: workshops, training, newsletter.
  - Networking with other sectors dealing with substitution is key.

- A substitution helpdesk is important to help SMEs and downstream users become familiar with the topic

Defining new support schemes or reorganizing existing support schemes was not highlighted as a key objective.

- **Sectors that need the most support on substitution are downstream users and SMEs.**

## VI. Vision of consulted parties

In this chapter, we have compiled the different visions of consulted Belgian parties. We conclude on whether they are coherent or conflicting.

Critical analysis of how applicable these lessons are to Belgium are available in the conclusions.

### VI.1. About substitution and sustainability

**Belgian public authorities highlight the need to accelerate substitution while at the same time avoiding regrettable substitution that has been encountered in practice.**

**FPS Economy recognises the importance of having a holistic view of sustainability to tackle substitution.**

In practice, the work scope of the REACH cell has changed considerably, beginning a focus exclusively on REACH and evolving to a more holistic approach to sustainable chemistry and sustainable economy. This emphasises the interconnection of chemicals and substitution with many other sustainability and policy topics (e.g., plastics, legacy substances, circular economy). It has thus become easier to adopt a coherent approach to developing a sustainable economy.

Using drop-in substitutes is typically a linear business model. Whenever companies applying for authorisation having only looked at drop-in substitutes or universal substitutes, SEAC can question the analysis of alternatives.

If possible, recycling processes that eliminate hazardous substances should be developed. However, because this is not always possible, FPS Economy is particularly interested by the ongoing work being conducted by France and the European Commission to develop a science-based approach to decide whether recycled substances should receive exemptions as part of restriction dossiers.

**Belgium could consider supporting restriction options when alternatives are valid without having consumer preference. Belgium could also include promotion campaigns or labels as part of the roadmap in order to change consumer choice. These strategic choices should be discussed at political level because, although they are clearly in line with sustainability, they go beyond existing regulatory mandates.**

SEAC can ask industrials to demonstrate they have considered alternatives other than drop-in substitutes, such as assessing the impacts of a no-use scenario, or reduced product performance.

However, it is not yet within the purview of public authorities to question: 1) whether we actually need the targeted use, 2) why we need that use, 3) whether, we change the process to make another article or another product, and 4) whether we change consumer behaviour.

Regarding consumer behaviour, for example, there are alternatives to chrome-plated taps, but these options yield taps with dull lustre, which is unattractive to consumers.

This limitation of the current regulatory process has been recognized at the federal level.

**The industry highlights that the Belgian strategy for substitution should contribute to a more holistic approach favouring informed, smart and sustainable substitution. The industry stresses that substitution should be prioritised when risks exist and cannot be adequately controlled by risk management options. A substitution support strategy should favour smart substitution over rapid substitution, in order to avoid regrettable substitution.**

Due to the structure of the REACH regulation, substitution has historically prioritized the most hazardous substances over the bigger risks. Attention should be focused on uses where there is a hazard, an exposure and where risk management measures are not enough.

According to the industry, substitution should be only encouraged actively in 2 cases:

- 1) A sustainable, technically and economically feasible alternative exists but the market is ineffective at enforce it (for instance, a diversity of small players must finance the same innovation process), or there is still a good chance that imported articles/mixtures contain the substance;
- 2) There is a significant health risk that is not properly addressed by existing restrictions and the no use scenario is more sustainable.

It is critical that sustainability of substitution be assessed because alternatives or no-use could have unfavourable consequences such as poor recyclability, higher energy consumption, and increased CO<sub>2</sub> emissions.

The industry highlights that substitution is already happening because of innovation, consumer pressure and current legislation. It contends that accelerating substitution could encourage drop-in substitution and adequate time is needed to find and consider smart substitutes and to implement them.

## **VI.2. Substitution, reduction and risk management**

**There is a consensus between the administration and the industry that reduction of hazardous substance use could be included as an element in the roadmap to substitution whenever alternatives have not been identified or are not viable.**

**Encouraging chemical leasing business models could help encourage adoption of functional substitution over drop-in substitutes.**

Chemical leasing is being studied by OVAM in Flanders It involves a business model that intends to shift the focus of chemical suppliers from the current emphasis on increasing sales volumes toward a value-added approach where a function is sold rather than a quantity of chemicals.

The potential of chemical leasing to positively impact substitution is unproven. An important consideration is that while leasing may reduce the volumes chemicals used, will it encourage substitution by less hazardous chemicals? The answer would probably be business model-dependant. We have not studied this issue in more detail for this project.

### VI.3. About the need for a public strategy

**Strengthening public policy to encourage substitution is strongly supported within the administration and visions of the different administrations (i.e. federal and regional, environment and economy) are aligned.**

In 2018, ECHA published a strategy to support substitution. It has been a source of motivation to go further at the federal level.

Belgian authorities highlight that there is currently insufficient legal or market incentive for the industry to embrace substitution and that a stronger EU policy should be established.

**Regions believe that the industry should remain responsible to find alternatives, but the public sector should share relevant non-confidential information they encounter.**

Although permitting officers may recommend known alternatives, recommendations from professional associations and specialised centres may be better perceived and more likely to be considered if it is also technically and economically feasible.

Regions highlights they are incapable of advising companies regarding how they should use an alternative, nor is it their mission.

**Brussels indicates that ECHA should also be responsible to identify alternatives.**

**Current political support for substitution is weak, because the subject is very technical and poorly understood. FPS Economy believes that heightening awareness of the issue is necessary in the political sector before additional resources and capacities can be committed to substitution, rather than the reverse.**

**FPS Economy highlights that the roadmap to substitution should favour collaborative projects.**

**Industry is not in favour of restricting or prioritizing collaborative R&D.**

Industry emphasises that the choice between open innovation, collaborative projects, and individual R&D is project-dependent and the decision should be up to the industry, depending on the strategic framework of each project. For many companies, substitution is related to competitiveness and, therefore, companies are unlikely to be willing to work with competitors. Companies that invest in substitution and related innovation want to leverage this to gain a competitive edge on the market.

Industry strongly supports existing financial support schemes to innovation (bottom-up). Industry does not see a need to actively encourage more collaborative research, because European “De minimis” rules for state aids already encourage collaborative projects (more money can be obtained for a collaborative project).

**Universities and public research are not yet perceived by the industry as a key partner for research on substitution. Cluster research and private R&D are perceived as more operational on the subject.**

It is not yet clear to the industry how the universities could contribute to substitution.

The understanding of the industry is that universities and public research institutes have little knowledge of REACH.

**Industry is not in favour of developing dedicated financial support schemes for substitution. Rather, they prefer reinforcing existing schemes and creating a “one-stop shop” approach for each region**

Industry believes there is already too much support directed to innovation channels and adding new channels should be avoided. Existing support schemes should be simplified, and existing clusters should be reinforced, rather than setting up new schemes.

Indeed, companies spend considerable time and effort navigating the existing complicated system and adding additional channels/schemes would only serve to lower each scheme's visibility.

Agoria currently supports a “one-stop shop” approach for each region, and it stresses which companies and which projects can apply to a given channel. Agoria prefers the regional approach to support innovation, and it does not propose to change it. However, the economic situation is different in each region.

**Industry is not in favour of pushing substitution as a criterion for individual R&D project assessment.**

Industry does not think substitution should be given priority over other aspects of sustainability, such as process optimization to reduce CO<sub>2</sub> emissions or developing the circular economy.

However, we suggest that substitution could be emphasized on the agenda of any cluster themes.

**The industry is not in favour of focusing public support on individual companies based on key substances or sectors.**

Authorities should support motivated/interested companies to have more impact (bottom-up).

However, substitution could be emphasized on the agenda of any cluster themes to create opportunities for collaborative projects, as appropriate.

**Industry recommends using different types of financial support for the different stages of the innovation process,**

- **Subsidies for private research (individual companies)** are relevant when it is early in the process (no alternative yet developed or implemented/tested; not yet on annex XIV) This is a way to a company to differentiate itself from competition. Authorities should better explain existing schemes rather than create new ones.
- **Subsidies for private research as part of collaborative projects between different private companies or public / private** should only be provided when companies are willing to collaborate because it requires a lot of resources to operate in a collaborative way (write a common project, align objectives, resources and results...).

- **Substitution workshops** should be targeted at substances already subject to authorisation. Companies who keep using substances subject to authorisation have difficulties and may or may not wish to communicate these.  
Agoria is not in favour of allowing public authorities sole responsibility for developing workshop agendas because they generally lack a comprehensive technical knowledge of substitution.

**Financial support should not be granted to laggards.**

Financial support for compliance is illegal, therefore, any financial support for substitution should occur before a substance is identified as SVHC or shortly thereafter.

Moreover, companies that are late in the entering the substitution process, should not be supported. This is unfair to their competitors who have already invested in substitution, with or without public support. This is perceived as key to maintaining a level-playing field.

**According to the industry, critical stages of the substitution process are not covered by financial support schemes and they should be.**

- Screening the hazard properties of alternatives is currently viewed as a matter of compliance and, therefore, is not supported. Industry believes it could be presented as a part of the feasibility study. Not supporting hazard screening may lead to insufficient the assessment of alternatives and lead to regrettable substitution. This also may increase the cost of substitution that has to be borne by companies and slow down the substitution process.
- Chemical start-ups have inadequate resources to register new substances. There is a big gap between scaling up production and placing new substances on the market. Support is needed for registration if we want to accelerate the marketing of alternatives and substitution.
- Downstream users need to adapt their installations to a change in product formulation. They would need support if we want alternatives to spread.

**Industry recommends that public authorities focus their efforts on simplifying administrative processes and subsidies application, informing industrials (mostly those who don't receive this information from their own networks) and facilitating networks.**

The ambition of the roadmap will depend on the budget that is available. essencia's key messages to public authorities' regarding priorities for the roadmap are the following:

- Avoid additional administrative layers/dedicated schemes.
- Focus less on listing new substances of very high concern and more on informing about constituents about REACH/substitution and the related actions of public authorities .and more on building a dialogue. The perception of the industry is that this would have more impact with the same resources.

- Workshops organized on substance substitution should have a link to the Belgian economy. These should be relevant and of interest to industry. Sector federations should contribute to priority setting because they receive the bulk of the substitution questions in their respective sectors. Substances addressed by workshops may be on the authorization list or projected to become list in the near-future (example of DMF).

The industry is open to co-organizing workshops with public authorities, or at least soliciting their help to advertise the workshops in order to give them more impact.

essencia could help by reaching out to the affected companies and building a dialogue.

**The “Flemish team green economy” is working on instruments that go beyond financial and technical support, and these should also be considered as well**

- **Green deals**<sup>33</sup> are voluntary collaborations between partners who want to overcome a shared problem (e.g., legislative, financial, innovation) they have encountered on the way of becoming greener. In Belgium, this instrument has only been used in Flanders so far. Green Deals can include private companies, non-governmental organizations, and public administrations. It is the intention of the Flemish government that the relevant ministries (i.e. environment and/or economy on this topic) are partners to Green Deals. The deal itself is a contract whereby the partners confirm their engagement and the activities they will develop during a period of 3 to 4 years. At this moment there is no Green Deal dedicated to substitution.

There is a Green Deal on circular procurement, which could contribute to support substitution. It currently focuses on the contract document and the legal problems that arise from this new type of procurement. The Green Deal on circular building includes an objective of avoiding use of hazardous chemicals in building materials and removing hazardous materials from the demolition material recycling loops.

- **Experimental legislation and legislation for poor innovation zones are being developed** in partnership with the general administration in charge policy affairs.
- **Green financing and environmental taxation** are also being considered but these remain at a conceptual level for the time being.

**Regions could enforce substitution priorities as part of their innovation policy and as key points of attention for permitting officers.**

The “Walloon Directorate for Industrial risks” currently encourages its officers in charge of permits to be attentive to substitution and inform companies whenever a substance is regulated or likely to be. These efforts are perceived as part of the permit-granting unit’s mission. The Walloon region understand that it has an increasing role to play in substitution, and that permitting is an interesting

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<sup>33</sup> <https://www.lne.be/green-deals>

lever to advance substitution. It embraces the opportunity to exchange relevant information with industrials.

Brussels Environment suggests spreading tools during permit instruction to help identify substances to substitute, alternatives or support schemes. For substances with alternatives, a choice could be given to companies: either they implement stronger risk management measures proposed in the permit, or they use proposed tools to substitute.

**Industry is in favour of prioritizing workshop themes based on relevance to the Belgian economy.**

## VI.4. About priority setting

**FPS Economy highlights the importance of establishing a science-based prioritisation approach as a first step.**

Prioritisation could be based on, for instance, priority hazards, volume used, or key sectors of the economy.

As a preliminary view, the following sectors are envisaged as the most important for the Belgian economy by FPS economy:

- Chemical and pharmaceutical industry. Belgium would like its industries to remain pioneers in in these fields
- Metal industry
- Plastics and polymers, including additives
- Waste sector, including legacy substances
- Aeronautic and defence sectors: Belgium has world leaders in the industry and substitution is particularly challenging considering high safety requirements and long approval delays.
- Small SMEs using SVHC (e.g., auto workshops using chrome plating techniques)

It is important to note that the above list is not based on objective criteria but rather on experience and examples. Some sectors/subjects may have been overlooked, but they should be a priority. It would be better to flag these early by using a methodological approach and not wait until problems arise (e.g., environmental and economic/regulatory challenges for the sector).

**FPS Economy highlights that political priorities should be defined as a second stage** in order to refine the list of priorities in relation to available resources and capacity. For instance, targeting SMEs, a specific sector or a substance would be part of this second stage. Of course, this should be coordinated with the regions.

**The industry is uncertain about the relevance of a top-down approach relying on public authorities to prioritise support for substitution because:**

- Building and applying a prioritization methodology would be expensive. Building on expertise seems more cost-efficient.
- Selection methodology will have to be fair, but the data require to ensure this are missing. There is no/little information available about who uses/searches for SVHC/alternatives because the supply chains are long, dispersed and they evolve. Industry is not aware of data that can accurately address these concerns.
- Public authorities currently lack the skills and experience to understand the pragmatic aspects of substitution. For instance, how will they assess whether an alternative is viable or not? With which data? Producers of alternative generally communicate ambitiously about the performance of their alternatives, and tend to present them as universal substitutes, whereas this is rarely the case.
- Public authorities would need to assess whether substitution is sustainable, and they may lack expertise or resources to do that as well.
- Authorities should support and encourage motivated/interested companies to have more impact.

#### **Industry would like to prioritize subjects for substitution using a risk-based approach rather than on a hazard-based approach**

The authorisation process currently relies on hazard criteria, not on risk criteria. However, in theory some risk-based criteria are used to select substances on the authorisation list, such as “wide dispersive uses.” However, this approach may provide a poor representation of the risk. For example, cobalt use in batteries is a wide dispersive use with low exposure risk because the cobalt is contained within a closed system. Once a substance has been placed on the annex XIV list, producers and importers can ask for authorisation based on a full risk assessment, but at their cost. Authorisation is expensive: 200-300k€ per company/consortium and it must be renewed regularly, depending on the validity period of the authorisation (3, 5, or 10 years typically).

There is extensive existing knowledge regarding the hazards of some metals, which explains why an emphasis has been put on regulating substances/products. Containing these metals (e.g., lead, chromium). However, in terms of risks, these are not necessarily the most concerning substances due to risk management measures which already in place through other legal frameworks (e.g., OELs).

#### **If a top-down approach is adopted industry proposes the following recommendations:**

- Priorities cannot be fixed as a list of substances, but rather, they should be set based on sectors and/or functions.
- Listed substances must be cross-linked with priority sectors.

## VI.5. The roadmap and cooperation

**No change in the distribution of competencies is expected by any stakeholder.**

**All consulted public authorities recognize they have a role to play to better incentivise substitution and would like to contribute.**

For instance:

- It appears logical for FPS Health to work on substitution (of SVHC and substances subject to authorisation) considering its current involvement in the authorisation process and its expertise related to avoidance of regrettable substitution.
- Brussels Region and the Walloon Region recognize their role in sharing information about alternatives to companies requesting permits.

**All public authorities see compliance as their core mission. We recognize that all administrations (federal, regional; environmental and economy) initially tend to minimise their own roles and insist on the key role of other administration levels.**

**Regions spontaneously defer to the European or federal competencies as responsible for developing the policies to incentivise substitution, while minimising their own role.**

According to regions, authorisation and restriction lists, e.g., EU BAT, as well as national product standards are the key policies to drive substitution.

- Permitting and inspections are perceived as compliance issues (ensuring that industrials comply with above-mentioned regulations), and not as mechanisms to strengthen and accelerate substitution.
- Going beyond compliance by information and advising companies is an emerging issue but the regions are concerned that this is not part of their responsibilities.
- Regional services that are members of the Belgian REACH committee have little contact with their colleagues in charge of public support to innovation. Strategic orientations of the regional environmental policy do not significantly influence the innovation policy.

**The federal administration acknowledges that regional supports to innovation and the industry's own initiatives demand are key to achieve substitution beyond compliance.**

The federal administration views regional support schemes and industry demand for alternatives as the key drivers to encourage substitution beyond compliance. However, they appear to minimise the need for information sharing and networking, which are part of their responsibilities.

**All parties would like to see the responsibility of setting priorities shared among the parties to the cooperation agreement.**

Regions (especially Flanders and Wallonia) have information about substances of concern found in the environment and substances of concern used by the industry. However, the regions do not see

themselves as competent/experienced to provide information on mitigating solutions/alternatives. In the future, regional services that are not currently members of the Belgian REACH Committee should also be involved to define priorities (e.g., OVAM for waste-related issues, VITO for technical expertise). Brussels fears that its contributions would be time consuming but contribute little because there are few industries in the region that represent the priority industries of the country (coachbuilders would be the main contributors).

The federal level has or can access information about substance hazards and alternatives, which is strategic to prioritisation.

**A discussion of proposed priorities between federal and regional levels before they are finalised is desired by all parties.**

FPS Economy highlights the importance of setting national priorities as a collaboration between the federal and regional levels to ensure a coherent strategy and save public resources by focusing public action and avoiding the same information to be collected several times.

Regions stress that some substitution topics have emerged as regional political priorities, and these should be discussed at some point so they may be prioritised accordingly at the federal level in order to ensure a coherent strategy for Belgium. This would help avoid in coherent situations such as the authorisation of a substance for the national market (federal competency) while its use is banned by the regions.

## VII. Belgium towards substitution - SWOT assessment (Strengths, Weaknesses, Opportunities and Threats)

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>✓ The competency of Member States to initiate SVHC identification, restriction or substitution is recognised <b>at European level</b>, which leaves <b>room to develop a national strategy</b>.</li> <li>✓ There is <b>increasing attention to the subject of substitution at the administration level</b>.</li> </ul> <p><u>About the cooperation agreement itself</u></p> <ul style="list-style-type: none"> <li>✓ <b>The distribution of competencies</b> among the different parties of the cooperation agreement is <b>clear and well followed in practice</b>, although not formalised by diagrams. It is also <b>perceived as clear</b> by the parties themselves. Each administration knows to whom they should address issues they are not in charge of, or specialised in.</li> <li>✓ Information exchange between the federal and regional levels regarding hazardous substances has increased since the REACH cooperation agreement was implemented. Regions welcome information shared by the federal level on the SharePoint platform.</li> <li>✓ The collaboration is functioning well about the core missions of the various parties to the cooperation agreement which is compliance.</li> <li>✓ The <b>discussion atmosphere</b> is perceived as <b>positive</b> and <b>oriented towards consensus</b>. <b>No past or emerging conflict</b> have been reported. Specific committees exist to deal with diverging positions. It has always been possible to reach consensus on Belgian positions.</li> </ul>	<p><u>About the priorities of the Belgian REACH committee</u></p> <ul style="list-style-type: none"> <li>✓ <b>The REACH committee mostly works on the EU REACH agenda:</b> substance evaluation, registration and authorisation dossiers, Belgian positions). There is little opportunity to discuss national or regional priorities during these committee meetings, and no maturity yet regarding the development of priorities for substitution;</li> </ul> <p><u>About the lack of awareness (although growing)</u></p> <ul style="list-style-type: none"> <li>✓ There is <b>no regional project, working group or strategy for substitution</b>.</li> <li>✓ Substitution is <b>not a priority political subject</b> in Belgium, whereas it appears higher on the political agenda for Denmark, the Netherlands, or Sweden. It is perceived as too technical and beyond the scope of subjects which have gained the attention of the media (e.g., glyphosate, rubber granules for synthetic surfaces) and for which there is exposure of the general population.</li> <li>✓ The <b>mindset to push and support industry</b> in finding solutions and encouraging them/advertising them when they do is <b>not there yet</b>.</li> </ul> <p><u>About the lack of information</u></p> <ul style="list-style-type: none"> <li>✓ Many parties possess <b>information that is relevant to substitution, but they do not know that their information is valuable</b> and do not</li> </ul>

<ul style="list-style-type: none"> <li>✓ Experts in administration know each other and communication is perceived as fluid.</li> <li>✓ FPS Economy and FPS Health have <b>aligned visions regarding substitution</b> in general, although the expertise they can bring to the subject is different. In other terms, both administrations aim at protecting the environment and human health, while ensuring legislation can be technically applicable in an economically feasible way. It has always been possible to find a consensus.</li> <li>✓ Federal consultations to the regions are successful when questions are specific (have you found substance X in the environment?).</li> </ul> <p><u>About support to substitution</u></p> <ul style="list-style-type: none"> <li>✓ <b>Current regional schemes are supported by the industry</b> and no new scheme or federal approach is requested.</li> <li>✓ <b>Clusters are strongly supported by all.</b></li> <li>✓ Both regions and federal levels <b>know of some adequate regional institutions and clusters</b> that can financially support substitution.</li> <li>✓ Workshops are strongly supported</li> </ul>	<p>think of sharing information. Information useful for compliance needs to be shared better.</p> <ul style="list-style-type: none"> <li>✓ <b>Regions do not communicate sufficiently about the challenges they face.</b></li> <li>✓ Administrations have only <b>vague notions</b> regarding: the <b>backgrounds of people they need to consult in other services, the type of information to which they have access</b>, and the procedures for accessing it. Therefore, it is difficult for the consulting party to assess the time needed to receive information once the request has been submitted. For instance, federal consultations with open questions (for instance priorities for substance evaluation) and short deadlines have poor response rates.</li> <li>✓ Regions have no <b>consolidated information about substance use</b> (e.g., an online databases), although this is improving in the Walloon Region. Information is dispersed, notably in permits.</li> <li>✓ REACH Helpdesk newsletter was not known to essencia.</li> <li>✓ Regional authorities in charge of delivering subsidies have no accurate knowledge of the challenges of substituting hazardous chemicals.</li> </ul> <p><u>About the lack of resources</u></p> <ul style="list-style-type: none"> <li>✓ All parties to the cooperation agreement have <b>full workloads and do not have enough resources</b> to work on substitution in a fundamental way. Implementation of regulations is the priority mission for all, and substitution is not yet a core competency of any stakeholder.</li> <li>✓ The federal level has limited resources to enable staff to attend workshops organised by other MS.</li> </ul> <p><u>About the lack of skills</u></p>
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	<ul style="list-style-type: none"><li>✓ Federal authorities do not have enough resources and knowledge about chemical substances and their specific applications in industrial processes.</li><li>✓ The policy officers in charge of REACH are <b>not skilled in innovation policy</b> and <b>relatively unknowledgeable about existing support schemes</b>, aside from knowing the names of organisations dealing with them.</li><li>✓ <b>The regions' understanding of their role regarding substitution is variable</b>: the Walloon Directorate for industrial risks encourage its officers to provide information during permitting requests and audits, whereas this is left up to the discretion of permitting officers in Brussels and Flanders.</li></ul> <p><u>About the distribution of competencies</u></p> <p><b>Competencies necessary to support substitution are diverse and these are distributed among several authorities in Belgium</b>: between 2 different federal administrations, 3 regions (, and provinces in Flanders for permitting. It is also important to note that within each region the service in charge of risks is separate from the service in charge of R&amp;D support). This stratification of roles will result in a complex roadmap.</p> <p><u>About the relationship with the industry</u></p> <ul style="list-style-type: none"><li>✓ Industry is not convinced that public authorities wish to build a dialogue with it.</li><li>✓ Industry does not feel sufficiently rewarded when they implement voluntary initiatives to help their members comply or move beyond compliance, or when they share their experiences. They would like to receive feedback and encouragement in order to move forward.</li><li>✓ Industry does not envisage universities as key partners.</li></ul>
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Opportunities	Threats
<ul style="list-style-type: none"> <li>✓ A <b>functional national strategy for substitution</b> can help Belgian industries gain <b>competitive advantage</b> by staying ahead of regulation and consumer demand.</li> </ul> <p><u>Change the mindset</u></p> <ul style="list-style-type: none"> <li>✓ With current or similar resources, there are multiple opportunities to <b>increase the capacity among policy officers</b> and to <b>change their mindset</b> in order to make them require substitution wherever this is possible (e.g., advising companies during permitting procedures and audits, using the BAT process as a data source). This approach is supported by the industry.</li> <li>✓ <b>A more open dialogue can be achieved with industry.</b></li> </ul> <p><u>Raise awareness</u></p> <ul style="list-style-type: none"> <li>✓ <b>Cases could be picked from the field/regions in order to raise awareness of national priorities among the members of the cooperation agreement.</b> This should be part of the REACH national committee meeting agenda and regions should be prepared better to provide input.</li> <li>✓ <b>The REACH Helpdesk (or other stakeholder) could develop arguments to encourage companies to substitute beyond regulation.</b> Company project leaders generally have difficulty in convincing their superiors and stakeholders that they must substitute / that a new product after substitution is better.</li> </ul>	<ul style="list-style-type: none"> <li>✓ If Belgium is <b>lagging</b> of other Member States in terms of <b>substitution strategy (ambition and timing)</b>. Belgian industries can <b>lose competitiveness</b> by failing to answer customer needs or by increasing compliance costs.</li> <li>✓ <b>Identification of priorities based on a methodology will be costly.</b> Information available in regional permits is either not centralised, or not digitalised (or both). This will likely to affect the feasibility of using science-based prioritisation based on defined criteria, unless additional resources are used to rectify the problem. Cross-checking the SVHC list with information available from companies is challenging. The list of all potential substances contained in a product is not provided, and especially not as CAS numbers (commercial names are often used). Except for CMR, hazards defined in product documents generally do not correspond to hazard considered for SVHC classification. Listing all ingredients does not appear feasible for companies. Identifying PBT/vPvB use based on information available to the regions would be more challenging to identify since the hazard mentions are not very specific (many substances are toxic to the aquatic environment for instance and don't classify as PBT). Additionally, it is often not specified on SDS (information on ecotoxicity is missing) and therefore companies cannot report it themselves. The industry highlights the absence of accurate data on substance use and available alternatives, readily available to feed a methodology.</li> </ul>

<p><u>Better exchange information</u></p> <ul style="list-style-type: none"> <li>✓ <b>Understanding the missions of each party to the agreement beyond REACH</b> could help identify relevant information for prioritisation.</li> <li>✓ <b>More information must be shared according to each party's information needs and available data</b> in order to reach a more fluid information exchange. <b>The federal level needs to better understand regional activities and priorities in order to adapt its information request and sharing to the regions.</b></li> <li>✓ <b>Pollutions and challenges encountered by the regions should be shared among the regions and with the federal level</b> because some pollution is cross-border, or it affects multiple competencies (workers, environment, neighbours). For instance, if regions identify substances of concern, they should share their concerns with FPS Health so that substances can be prioritised for RMOA. Stronger participation of the regions in this process is expected.</li> <li>✓ The REACH Helpdesk could do more to inform companies about regulations (current and proposed). <i>essencia</i> provides such as regulatory watch, but its efforts exclusively target its members. Public authorities could reach non-members, as well as companies from other sectors (recycling companies, downstream users). The newsletter could be better disseminated.</li> <li>✓ Policy officers could visit companies in order to develop a better understanding of challenges in the field.</li> <li>✓ Industry recommend that the administration more regularly engage with stakeholder consultations (including but not limited the industry).</li> <li>✓ Industry would like to see a presentation that provides an overview of FPS Health and Economy work, e.g., on substance evaluation, during the workshops.</li> </ul>	<ul style="list-style-type: none"> <li>✓ <b>Developing regional case studies is challenging because of the time needed for the regions</b> to collect data from the field due to the absence of database for SVHC use.</li> <li>✓ <b>More resources would be required at regional level if the regions need to significantly contribute to substitution</b> (digitalisation projects, sharing information, exchanging priorities...)</li> </ul>
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Prioritisation

- ✓ **Prioritisation based on consultations receives stronger support** by industry than a prioritisation that would rank substances based on defined (often quantitative) criteria. This statement is also supported by other Member States having recently defined strategies for substitution (Sweden, the Netherlands), but France.  
**Consultations are likely to increase support for the roadmap at lower cost than an elaborate ranking methodology. The latter is not perceived as more accurate** due to a lack of reliable data.

Tools and data sources

- ✓ Other Member States or NGOs already list priority substances, including substances that are likely to be classified as SVHC, **therefore, Belgium does not need to develop its own list of priority substances.**
- ✓ **A centralized database containing information about substance use in permitted installations** in each region (based on information provided by the regions) would be useful to the federal level.
- ✓ In terms of tools, **an outreach/education website** would be useful to help companies (especially small ones) using hazardous products understand the legislation and what they should do. Generic queries in browsers on hazardous products provide poor quality information.
- ✓ **A user-friendly database to find information on hazardous products** would be useful (like the Chemsec SIN list but for products), to help downstream users more readily understand the ingredients in their products.).

## VIII. Appendix: Belgian strategy to substitute SVHC: key challenges

### VIII.1. The contribution of REACH to substitution

Chemical substitution is commonly defined as “the replacement or reduction of hazardous substances in products or processes by less hazardous or non-hazardous substances” (usually called **drop-in substitutes**), “or by achieving an equivalent functionality via technological or organisational measures”<sup>34</sup> (so-called **functional substitution**).

The European REACH Regulation n°1907/2006 came into force in 2007. REACH aims to identify, evaluate and control chemicals that are manufactured, imported and placed on the European market, based on the principle of "no data, no market". Substance hazards and uses are documented via REACH registration and evaluation processes. Substances of very high concern (SVHC) are identified and shall be gradually replaced by less hazardous substances and withdrawn from the market, where technically and economically feasible, as foreseen by the authorisation and restriction processes.

REACH foresees that substances meeting one or several of the following criteria can be classified as SVHC and, thereby, becoming candidates for the authorisation list:

- carcinogenic, mutagenic or toxic to reproduction (CMR), category 1A or 1B in accordance with CLP Regulation;
- persistent, bioaccumulative and toxic (PBT) or very persistent and very bioaccumulative (vPvB), in accordance with Annex XIII of REACH;
- which, on a case-by-case basis, give rise to a level of concern equivalent to that caused by the use of CMR or PBT/vPvB substances

However, not all substances meeting these criteria are classified as SVHC. Member States or ECHA, at the EU Commission’s request, must prepare an Annex XV dossier containing relevant hazard and market information. Once identified as SVHC, information and notification requirements apply to articles that contain SVHC.

Substances on the candidate list are regularly evaluated by ECHA for inclusion on the list of substances subject to authorisation (Annex XIV) based on a combination of risk assessment (dispersive uses) and



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<sup>34</sup> Lohse J. et al. Substitution of Hazardous Chemicals in Products and Processes. A report compiled for the Directorate General Environment, Nuclear Safety and Civil Protection of the Commission of the European Communities. Hamburg, March 2003.

socio-economic assessment (availability and feasibility of substitution). Once included in Annex XIV and the implementation delay period has expired, the use and placement of the substance on the common market is prohibited unless users or importers of substances request (individually) and receive an authorisation, or if the substance and its use are covered by an exemption from authorisation.

Exemptions from authorisation and restriction requirements, or delays before implementation may be requested if substitution is not technically feasible (based on an Analysis of Alternatives) or if the societal cost of substitution exceeds the expected benefit (based on a Socio-Economic Assessment). Substances subject to authorisation can still be present in imported articles. This is the reason why the authorisation process must be complemented by the restriction process in order to completely remove a substance from the market. Restriction goes further by forbidding specific uses of a substance in mixtures / articles, including imported mixtures / articles. Restrictions proposed by Member States or ECHA at the Commission's request and include a socio-economic assessment and this applies to the entire value chain.

The socio-economic assessment weighs the risks of continued use of a substance against the cost of withdrawing it from the market as a result of substitution.

**The combination of SVHC identification, authorisation and restriction increases the cost of using hazardous substances (administrative burden, reputation towards the downstream users and final users) and, thus, encourages their substitution<sup>35</sup>.**

The recent review of REACH by the European Commission (March 2018) confirms that having substances on the candidate list or flagged as priority substances for restriction drives research for alternatives within companies, in anticipation regulatory and supply-chain pressure.

## VIII.2. Why REACH is not enough to support substitution?

Despite the positive contribution of REACH to substitution, numerous reports<sup>36</sup> have concluded that the way REACH is currently being implemented does not provide enough incentive for substitution.

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<sup>35</sup> European Commission- march 2018- Commission General Report on the operation of REACH and review of certain elements

<sup>36</sup> Note Client Earth/Chemsec - march 2018 – How to find and analysis alternatives in the authorisation process

ECHA – January 2018 -Strategy to promote substitution to safer chemicals through innovation

European Commission- march 2018- Commission General Report on the operation of REACH and review of certain elements

ECHA strategic plan 2019-2023 - draft- march 2018

Lowell study - august 2016- Improving the Identification, Evaluation, Adoption and Development of Safer Alternatives: Needs and Opportunities to Enhance Substitution Efforts within the Context of REACH

Note by SPF Economy- Simon Cogen – 2018- Substitution of chemicals of very high concern as part of the transition to a sustainable economy

European Commission – 2015- Monitoring the Impacts of REACH on Innovation, Competitiveness and SMEs

Indeed, the Analysis of Alternatives (AoA) and Socio-Economic Assessments (SEA) can be biased<sup>37</sup> and conclude that substitution is not technically or economically feasible, leading to authorisation or exceptions to restriction based on erroneous arguments.

**The following issues have been reported:**

- 1) Alternatives do exist, though they may not be identified by the applicant or the public authority;**
- 2) Emphasis is often on drop-in substitutes, whereas redesigning the product/process could help find alternatives that have equivalent functionality;**
- 3) Alternatives would be viable if enough resources were dedicated toward supporting innovation.**

- 1) Alternatives do exist but could not be identified by the applicant or the public authority.**

In authorisation dossiers or exemptions to restriction applications, information is supplied mainly by the applicant, whereas valuable information on the availability and economic feasibility of alternatives may be available from third parties (e.g., competitors, industrials from different supply chains, substance or technology providers, NGOs). Third parties may react to analysis of alternatives and SEA via the consultation's mechanisms, but they are not proactively contacted which decreases their effectiveness in helping fill in data gaps.

- 2) Redesigning the product/process could help finding alternatives that have equivalent functionality, but emphasis is often put on drop-in substitutes.**

Substance manufacturers (*a fortiori* public authorities) are sometimes only partially aware of the exact function of their substance in its final application(s) and of its required performance. Brands produce product technical specifications their contract manufacturers, but only provide limited information on their exact needs to in order to protect sensitive information. Additionally, the complexity of the supply chain may separate the substance manufacturers several commercial transactions (process stages) from the final user.

Due to lack of adequate data to understand the exact function of the SVHC in a product, little effort has been placed on redesigning the product or technology, and the search for alternatives has generally been directed towards the substitution of a chemical performance function (drop-in substitutes). An alternative is deemed suitable when it achieves a similar performance level, which is only a partial view of the potential substitution. Indeed, chemicals with lower performances may be adequate for the targeted end uses, either directly or after adaptation of processes or materials. Additionally, because hazards of substituted substances are generally better known than the hazards

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Ministère de l'Écologie et Ministère de l'économie et des finances (France)- octobre 2012- Mise en œuvre de l'autorisation au titre du règlement REACH

UMAS Lowell – July 2017- Approaches for Accelerating Substitution under REACH and Beyond: Strategic Options Assessment

<sup>37</sup> Note Client Earth/Chemsec - march 2018 – How to find and analysis alternatives in the authorisation process

of alternatives, looking for drop-in substitutes can lead to regrettable substitution, i.e. substitution of one SVHC by a substance that ends up being as or more hazardous but is not yet regulated.

**3) Alternatives would be viable if enough resources were dedicated to innovation and if they were efficiently allocated.**

Innovation is predominantly market-driven, and incentives to work on developing products free of hazardous substances are insufficient. The REACH impact assessment on SMEs shows that approximately half of companies surveyed have transferred R&D resources to support compliance with REACH, thereby reducing the potential of these companies to look for alternatives (or to fund other R&D projects).

The current process of finding alternative solutions is largely based on the initiative and financing of individual companies. Many competing companies are called upon to carry out similar research. In addition, the approach is generally not concerted within a single value chain, which can lead manufacturers, users and recyclers to seek alternative solutions in parallel, i.e., conduct redundant research. Finally, the same solution may be relevant for several value chains that do not communicate with one another.

Support to innovation and substitution is generally directed towards individual companies, without dedicated programmes to set priorities in advance, and often according to a bottom-up approach (solicitation of support by companies). Moreover, substitution is not the focus of these innovation programmes and not even necessarily considered as criterion.

Consequently, current support schemes are not optimal because:

- they hardly reach SMEs and companies with low awareness of the relevant issues, and therefore, support does not cover the whole market;
- some priority themes for the environment and human health are cast aside due to the bottom-up approach and absence of focus on substitution (or sustainability);
- this can lead to support of parallel similar initiatives at different levels (European, federal, regional) or for different sectors. But these parallel efforts also may lead to substitution solutions and the implementers of these will gain competitive advantage from their success. In summary, the optimum size of research projects is often somewhere between single companies acting in a single stage of the value chain and a European, full value chain or cross-sectorial project. Competition stimulates and benefits this process.

### VIII.3. Challenges to substitution

#### Information is key

Support for substitution also means accelerating information sharing within and across supply-chains and supporting match-making and networking.

- **Information about priority substances targeted for substitution and affected sectors** should be shared better. When a substance is introduced on Annex XIV, it is often already too late to find an alternative, test it and get the necessary approvals<sup>38</sup>.
- **Information about the final function of a given substance** in an application is not sufficiently shared within supply chains, even to manufacturers; this complicates the search for suitable alternatives and often limits the solution to finding drop-in substitutes<sup>38</sup>.
- **Information about the availability and portability of some existing technologies** for substitution is not shared sufficiently, either because they are new and unknown or because they come from a sector historically unrelated to the companies that need to substitute.
- Information does not circulate well due to **language barriers**<sup>39</sup> and **supply chain complexity**<sup>38</sup>.
- Information regarding the presence of substances of concern in waste is **generally not available to recyclers**; therefore, it is not readily available to the users of recycled materials<sup>40</sup>.

In conclusion, in order to favour all types of innovations, information should be shared widely throughout the affected sector, by chemical function and end use.

Although the need to increase information sharing is clearly identified, the first issue that should be addressed is the access to information itself, as reported by consulted reports:

- **Available information** via the REACH process (registration, authorisation, restriction, notifications, substitution projects...) **on existing alternatives is not readily usable** to identify alternatives. Some information is confidential and is not made available to the authorities in charge of evaluating dossiers. Additionally, information is dispersed in many data sources. It is a current strategic objective of ECHA to improve availability of information regarding alternatives and significant results are expected for mid-2019.
- Some information is kept **confidential** and can neither be shared to other services of the concerned public authorities to set priorities, nor be used directly to suggest options for substitution to competitors or different supply chains.

### Key challenges to a public strategy to support substitution

The consulted reports list numerous challenges for public authorities (and Member States in particular) to support substitution. These are key focal points of this study.

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<sup>38</sup> Lowell study - august 2016- Improving the Identification, Evaluation, Adoption and Development of Safer Alternatives: Needs and Opportunities to Enhance Substitution Efforts within the Context of REACH

<sup>39</sup> ECHA strategic plan 2019-2023 - draft- march 2018

<sup>40</sup> European Commission- march 2018- Commission General Report on the operation of REACH and review of certain elements

- There is **insufficient staff**<sup>38</sup> focusing on substitution among Member State authorities, ECHA, and the Commission. Instead, public authorities view their role as one of collating data on hazards and exposures and defining adequate risk management measures.
- Public authorities **lack the technical/technological expertise**<sup>39</sup> to identify suitable alternatives, which can affect their capacity to identify areas where innovation is needed.
- **Information is insufficiently shared geographically.** Existing chemical substitution initiatives among the European Commission, ECHA and Member States remain largely disconnected.
- **Information is insufficiently shared between supply chains, chemical functions and/or end uses.**
- **Language barriers/challenges may limit** proper circulation of information on available alternatives along and across supply chains and among countries.
- Substitution needs to **be better linked with innovation, sustainability and circular economy policies.** Government agencies in charge of promoting substitution need to be better connected with **research institutes, innovation funds and clusters** related to a specific substance.
- **Substitution** should also be included within the scope of **innovation policy**, and substitution projects should be viewed as opportunities for economic and sustainable development.
- **Research in academia and research institutes does not respond to the needs of industry** for alternatives to SVHC.
- **Coordination between compliance (AoA) and substitution** efforts is needed.
- There is a need to **match companies needing alternatives with solution providers**, for example, via a match-making database or support office.

Having explored the different obstacles to substitution, we can conclude that a **public strategy to encourage substitution of SVHC** is needed in order to achieve **the following objectives**:

- Within the scope of compliance with REACH, substitution of SVHC can be strengthened by **improving AoA and SEA methodologies** in order to properly implement authorisation and restriction when alternatives exist and are viable;
- Beyond compliance:
  - **Increase awareness about substitution** within public authorities and the industry;
  - **Define priority areas for innovation**;
  - **Facilitate information sharing about alternatives (existence, portability)**;
  - **Facilitate supply-chain networking and collaborative innovation**, working on functional substitution;

- **Design efficient public support schemes for innovation** (technical and/or financial) to help find, test, adapt and adopt alternatives. This considers confidentiality and intellectual property issues.
- **Green public procurement**, including criteria on SVHC and available **tax incentives** could be relevant instruments to encourage substitution.

This study focuses on the latter category of public actions, i.e. actions that go beyond compliance<sup>41</sup>.

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<sup>41</sup> Although information relevant to the AoA and SEA is relevant to prioritise and coordinate public support as well.

## IX. Appendix: data sheets “support schemes”

A searchable excel listing of support schemes complements this report.

### IX.1. Flanders

#### IX.1.1. VLAIO

##### VLAIO Baekeland mandates

Baekeland mandates support basic research that – if successful – has clear economic objectives and offers added value to the company involved in the project. The research should be directed towards obtaining a doctorate (PhD) diploma and meet the criteria for doctoral research. In other words, the project is characterized as strategic basic research with an economic finality that is innovative and provides the PhD student with ample intellectual properties rights. In order to qualify for support, the project proposal must offer a scientific challenge that allows the researcher to become intellectually competent and grow into a full-fledged researcher.

All companies with an operating location in the Flemish Region can apply for a Baekeland mandate. The head office may be located elsewhere. A selection criterion in the evaluation is the added value for Flanders. The agency may declare the application of entities that do not yet have a seat in Flanders - but do provide enough valorisation in the future - exceptionally admissible.

An application can be submitted for a Baekeland mandate throughout the year. Agentschap Innoveren & Ondernemen jointly make award decisions twice per calendar year.

With a Baekeland mandate, co-financing is provided for:

- personnel costs
- operating costs
- equipment costs
- fixed costs for a specific employee.

The support that VLAIO awards depends on the size of the company:

- 50% for a large company
- minimum 60% for an SME.

The agency pays the subsidy to the company that is responsible for the full compensation of the partners.

##### VLAIO Innovation mandates

An innovation mandate is specifically intended for postdoctoral researchers to carry out a project in close cooperation with the business world, either with an existing company or with a view to setting up a new company. The main objective of the research project is the economic valorisation of research and to extend the results of basic research to make them applicable within companies, in other words for projects where the degree of risk is still too high to be implemented as an R & D project.

##### Who is eligible?

- **PHD students:** The application is open to all holders of a doctoral degree. The scheme is open to all nationalities and all fields of study / scientific disciplines.

- **Companies:** All companies with an operating location in the Flemish Region can apply for an Innovation mandate. The head office may be located elsewhere. A selection criterion in the evaluation is that the proposed project must provide added value for Flanders. The agency may declare the application of entities that do not yet have a seat in Flanders - but do provide enough valorisation in the future - exceptionally admissible.
- Mandates carry out the research project in collaboration with the company and with the knowledge institution. The awardee can divide his time between the knowledge institution and the company.

Compensation covers 50 to 100% of the personnel and operating costs of the postdoctoral researcher.

### VLAIO Development Project

The development project offers advice and financial aid for innovative ideas that can lead to a successful business. This type of project includes the development of a completely new or significantly innovative (improved) product, process, service or concept, and the result has an important impact on the performance of the company.

#### Eligible entities:

- All companies with operational activities in the Flemish Region (or at least an intent to be).
- Non-profit organizations and public organizations with operational activities in the Flemish Region (or at least a clear initiative) and which conduct economic activities.

Subsidy of 25 to 50% of the project total with a support minimum of 25 000 Euros.

#### Surcharges:

- An increase of the aid percentage of 10% can be achieved if there is a relevant and substantial cooperation between at least two independent companies, of which at least one is an SME and / or where it concerns cross-border cooperation within the framework of an officially recognized European network in which the agency participates. In the case of cooperation, each of the business partners is at risk and neither of them contributes more than 70% of the project budget.
- An increase of the aid rate by 10% for medium-sized companies
- An increase of the support rate by 20% for small enterprises

The following conditions apply to activities in the later stages of development (demonstration or pilot scale):

- The support on material costs incurred linked to a pilot / demo installation is limited to a maximum of 25%: no surcharges can be added.
- The costs for this part of the project are limited to a maximum of 20% of the total project cost to a maximum of € 500,000 support.

### VLAIO Development Project on pilot scale

In 2017, VLAIO launched a call for development projects on a pilot scale. The aim is to build experience on the practical implementation of support for the later phase of the innovation process of companies.

The focus of this call is on projects focused on pilot scale / demo activities (TRL (technological readiness level) 6-7) by both individual companies and collaborations between two or more companies. This ensures that project enough maturity exists at the start of the project to make it viable (e.g., proof of concept on a smaller scale), but that commercial rollout is not yet possible.

#### Eligible entities:

- All companies with operational activities in the Flemish Region (or at least a clear approach to have this in the near-term).
- Non-profit organizations and public organizations with operational activities in the Flemish Region (or at least a clear initiative) and which carry out economic activities.

#### What is eligible?

Aid ranges from a minimum of € 100,000 and to a maximum of € 500,000

- Basic support: 25% of the accepted costs;
- Increase of the basic support percentage:
  - 10% if the project is a collaboration with other independent companies or an international cooperation (provided that no company has more than 70% share in the costs);
  - 10% for a medium-sized company;
  - 20% for a small business;
- The total support percentage is limited to 50% of the project costs;

The support for material costs linked to a pilot / demo installation is limited to a maximum of 25%, no surcharges can be added;

A company can only act as the primary applicant in one project. It is important to mention that retroactive no support can be granted.

#### What is not eligible?

- For projects where half or more of the project cost/effort will be expended in the earlier phases of the innovation trajectory, the project is categorized as strictly a research or development project. For these types of projects, proposals can be submitted continuously.
- Purely investment projects are also not the subject of the testing call presented here. Investment projects aimed at development of production equipment for commercial roll-out of innovations should be submitted to the complementary support programmes of VLAIO, such as Strategic Transformation Support (STS) and Strategic Ecology Support (STRES) and to other support options of PMV (see co-financing, PMV- Venture Capital and PMV Business Loans) and the EIB (see EIB EIF-EFSI: European financing options for companies).

### VLAIO Ecology Premium +

An ecology premium is financial compensation to companies that propose to make ecological investments in the Flemish Region. With the ecology premium, the Government of Flanders wants to encourage companies to organize their production process in an environmentally friendly and energy-efficient manner, and it will compensate part of the extra investment costs that such an investment entail.

#### Eligible entities:

The ecology premium is only awarded to companies that invest in the Flemish Region, subject to the following provisions:

- The company is a valid company as defined in the Decree of 16 March 2012;
- The company complies with all the regulations that apply in the Flemish Region;
- It conducts an eligible main activity (NACE code);
- No administrative authority has with a controlling influence in the company. There is a presumption of a controlling influence if 50% or more of the capital or voting rights of this company are directly or indirectly in the hands of an administrative authority;
- The company acceded to the energy policy agreements before the application date of the aid application if it belongs to its target group (usually large energy consumers > 0.1PJ);

The ecology premium is awarded in the form of a subsidy, and the award is determined by:

- the nature of the investment;
- the ecoclass to which a technology belongs based on its ecological number<sup>42</sup> with corresponding subsidy percentage;
- the size of the company;

The total amount of subsidies granted to a company is a maximum of € 1,000,000 over a period of 3 years from the filing date of the successful aid application.

### VLAIO Tetra

TETRA projects aim to translate recently available knowledge into concrete, useful information so that the target group can innovate faster and more efficiently. This may involve new technology, recently completed research or existing knowledge from another domain or sector.

The target groups for the project results are Flemish companies and / or social profit organizations. The projects must have at least one economic objective (to be translated into competitiveness, employment and/or investments at companies in Flanders). In addition, the project can propose to tackle a social challenge.

In addition, the projects must also be in line with the teaching assignment of the applicant(s). There must also be a demonstrable relationship, added value and knowledge flow from the project to higher education or to the integrated education(s) of the applicant(s). The project must provide added value for students who graduate in these programs.

#### Eligible entities:

- The applicants for TETRA project awards are research groups from Flemish university colleges and / or Flemish universities that actively engage in practice research. For

<sup>42</sup> indicates to what extent this technology contributes to the Kyoto and environmental objectives of the Flemish Authorities.

collaborative projects, the applicants must appoint a main applicant and a project coordinator.

- Research groups associated with professional bachelor’s degrees can submit a 1-year TETRA preparation project application as a preliminary project.
- Other research groups or research organizations can work as a partner or as a large subcontractor (subcontracting > € 8,500) or a maximum of 1/3 of the budget on a TETRA project
- Companies, individuals, clusters, federations or government bodies cannot be applicants or partners., But as members of the user group, they can play an important role in managing the project, exchanging knowledge with the researchers and spreading the project results.

Every year there is a single call for TETRA projects and TETRA preparation projects. The call is usually opened in September. The submission is due in January of the following year, and the awards are made in May-June.

The subsidy can be up to a maximum of 92.5% of the project cost. A minimum co-financing of 7.5% is required from the target group (via private funding).

**TETRA project**

- one call per year (opening in autumn)
- duration: two years
- budget:
  - min. € 100,000 - max. € 480,000
  - the applicant(s) together must represent at least 2/3 of the total budget
  - large subcontracts (each > € 8,500) together can represent a maximum of 10% of the total budget

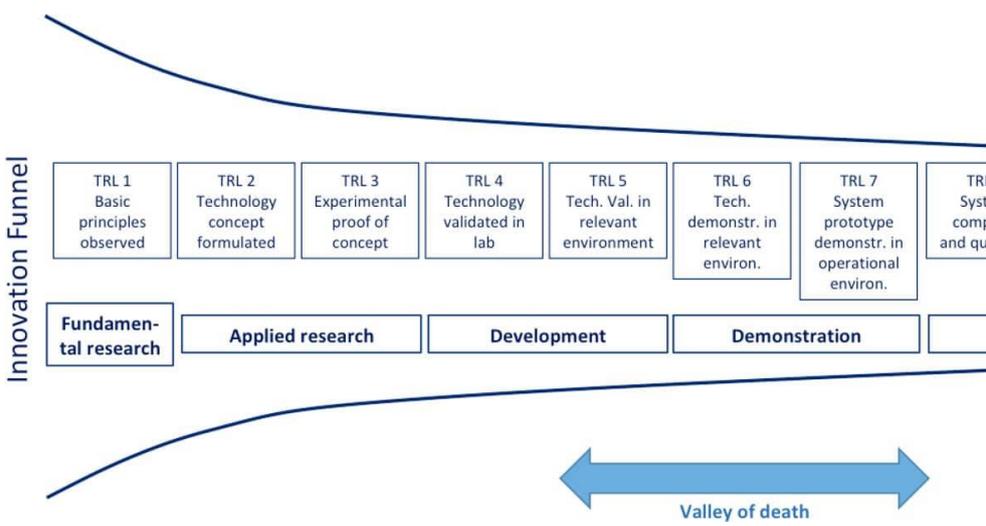
**TETRA preparation project**

- one call per year (opening in autumn)
- duration: one year
- budget:
  - min. € 100,000 - max. € 120,000
  - applicant(s): only research groups affiliated with a professional bachelor's degree program at a Flemish university college
  - large subcontracts (each > € 8,500) together can represent a maximum of 10% of the total budget

**IX.1.2. BLUECHEM**

Theme	Questions/Answers
<b>Description of the tool /mechanism</b>	<p><b>Q: Objective, background</b></p> <p>Bluechem is the first incubator in Belgium that specifically focuses on innovation and entrepreneurship in sustainable chemistry. Example projects may include valorisation of waste and side streams, process optimization, and development of renewable chemicals and sustainable products. Substitution of chemicals currently not target, but BlueChem indicates it will align with Catalisti’ s strategic targets.</p> <p>BlueChem will open its offices in 2020 in the climate-neutral business park Blue Gate Antwerp, the heart of one of the largest chemical clusters in the world.</p>

	<p><b>Q: Structure of the tool and resources available (HR + financial envelope for operating)</b></p> <p>BlueChem is one of the first real estate projects in this business zone with spatial expansion possibilities for growers.</p> <p>In addition to BlueChem, the University of Antwerp is building <b>Blue_App</b>, an open innovation and training hub for potential entrepreneurs and innovators from knowledge institutions and large and smaller industries. This pre-incubator enables growth of business and technology ideas in sustainable chemistry, from product development and validation to pilot demonstration of technologies and their market launch.</p> <p><b>Q: Origin of the initiative (public, private, non-profit, academic)</b></p> <p>BlueChem is a public-private partnership, with the private sector funding accounting for half of the investment. The private partners are Bopro (BSI), DEME (DEC) and essenscia. The government partners are AG Vespa, PMV, POM (Provincial Development Company) Antwerp, City of Antwerp and VITO (Flemish Institute for Technological Research). Catalisti is also actively involved.</p> <p><b>Q: Has the tool/mechanism undergone substantial changes over time? If so, please explain, including the rationale behind the change</b></p> <p>N/A</p>
<p><b>Categorisation of tool /mechanism</b></p>	<p><b>Q: How does the initiative support substitution (financial/non-financial support) Specify what non-financial support consist of (information-sharing, training, networking...)</b></p> <p>BlueChem offers a combination of state-of-the-art infrastructure with a comprehensive customized service and financial support through a special investment fund. For example, promising chemical companies can not only test their innovations in chemistry laboratories with specific equipment under the best conditions, but they also further develop them through the interaction and collaboration within a unique network of international companies and knowledge partners.</p> <p>Services include: Purchasing equipment, Advice on environmental permits and safety regulations, support regarding banks and insurances, Business development, financing support (venture capital, innovation support and subsidies), Internationalization strategy, IP, patents and trademark law, legal advice, personnel management</p> <p>Companies that establish themselves in BlueChem can benefit from the Investment Fund of the incubator. The fund provides financial support (up to 700 euros / m<sup>2</sup>) for construction of laboratory spaces and flexible spaces. The Investment Fund can be engaged to fund purchase of specialized equipment for chemical research.</p> <p><b>Q: What is the geographical scope of the tool/mechanism</b></p> <p>Europe/International</p>
<p><b>Eligibility</b></p>	<p><b>Q: Which industry sectors are targeted? Who is eligible?</b></p> <p>BlueChem targets starting and growing companies, SMEs and open innovation projects of large companies. BlueChem is also a good place for foreign investors to</p>

	<p>scout interesting research projects and to discover attractive investment opportunities.</p> <p>BlueChem focuses attention on start-ups and innovative SMEs with growth potential. Especially in chemistry, starters often encounter difficulties in bridging the so-called 'valley of death', the very risky period between the development phase of new ideas and the effective industrial production. This is partly due to the high start-up costs for infrastructure and equipment, the need for an extensive knowledge network and the high environmental and safety requirements that are specific to the chemical sector.</p> 
<p><b>Cooperation (cross-regional, cross-border, cross-initiatives)</b></p>	<p><b>Q: Does the support tool/mechanism cooperate with other mechanisms/entities?</b> Yes</p> <p><b>Q: Specify which ones</b> With VLAIO, European Fund for Regional Development (EFRO)</p>
<p><b>Qualitative assessment of the tool/mechanism</b></p>	<p><b>Q: What are the perceived advantages of the tool?</b> The initiative is designed to strengthen the attractiveness of the Flemish chemical sector and attract additional investments. The incubator strives to become an additional asset to anchor the chemical industry in Flanders in the long term and prepare it for the future.</p> <p>There are already so-called lead plants in Flanders, chemical plants that are world leaders in terms of their energy efficiency, complex processes, high safety standards, productivity and quality standards. BlueChem should initiate 'lead innovations' with which Flemish chemistry will move the rest of the world towards a more sustainable society and circular economy.</p> <p><b>Q: What are the perceived disadvantages or shortcomings of the tool?</b> N/A</p> <p><b>Q: Is there room for improvement? Please specify on which aspects and to what extent?</b> N/A</p>

	<b>Q: Examples of success of the tool</b> N/A
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### IX.1.3. CATALISTI

Theme	Questions/Answers
<b>Description of the tool/mechanism</b>	<p><b>Q: Objective, background</b></p> <p>Catalisti is one of the spearhead clusters in Flanders focusing on Chemistry and Plastics. The purpose of the spearhead cluster is to support and help build partnerships in Flanders between policy-makers, research and knowledge institutions and companies, based on the triple helix principle. It is therefore a Public-Private Partnership project.</p> <p>The cluster builds upon earlier initiatives such as FISCH, the Flanders Innovation hub for Sustainable Chemistry, and FPV, Flanders' PlasticVision. Like these initiatives, Catalisti focuses on cooperation between the triple helix partners; so, cooperation between the various subsectors, such as (basic) chemistry, plastics, biotechnology; and cooperation between companies. Over the past few years, 39 innovation projects have already been started, accounting for 9 patents and some promising spin-offs.</p> <p>Catalisti consists of a team of domain specialists (+/-10) who capture, facilitate and catalyse innovative projects in the cluster network according to the Triple F principle (Find, Facilitate, Fulfil). Catalisti captures and initiates innovation projects and finds suitable partners focused on sustainable new business opportunities. It also has the competences and resources necessary to provide specific services and to coach in funding applications. Catalisti has its own budget earmarked to provide subsidies to accelerate innovations. Finally, they catalyse cooperation between innovative companies and knowledge institutes to quickly achieve concrete solutions. Catalisti experts make their knowledge, expertise and network available to its various partners.</p> <p>Catalisti' s mission is to spend its budget allocated for innovation in the chemicals sector to promote internationalisation (International cooperation with Flemish companies), leverage the funding provided by VLAIO in 'regular' funding and focus on education and societal challenges.</p> <p><b>Q: Structure of the tool and resources available (HR + financial envelope for operating)</b></p> <p>Catalisti employs approximately 10 people. To pay its operational costs, Catalisti receives up to 500.000 €/year from the Flemish administration. It is committed to obtain at least an equal amount from private funding (1 € for 1 € principle). This leads to a minimum working budget of 1 million € although this amount may be higher if private partners provide more funding.</p> <p>Catalisti distributes approximately 10-11 million € of project support which amounts to (the amount has risen over the past years from the original 5M€).</p>

	<p>Project funding provided by Catalisti must be awarded based on the VLAIO rules for subsidies, notably about the percentage of the project that is funded. VLAIO is also involved in evaluating the projects. This also means that Catalisti must work with the existing funding instruments of VLAIO, i.e., funding for applied research and development. This can be considered a limitation because funding is also required for scaling-up via Pilot and demonstration projects. To overcome this limitation, Catalisti has worked with VLAIO to close this gap. Beginning last year Pilot and Demonstration projects can also be funded and this is a big step forward (also in the context of REACH).</p> <p>In comparison to other funding programmes run by VLAIO, Catalisti is obliged to fund projects that involve at least 3 partners from the industry/business. They can be SMEs as well as large corporations. Besides facilitating and funding projects, Catalisti also refers companies to ‘regular’ innovation funding via VLAIO.</p> <p>Catalisti works based on 4 strategic programmes: <b>Renewable Chemicals, Process Intensification, Sidestream Valorisation, and Advanced Sustainable Products</b>. REACH-SVHC projects can fall into several categories, but frequently they are in the Renewable Chemicals category. These strategic objectives are set via intense discussions with companies and research institutes (what do companies need and what knowledge is available?). About substitution of chemicals, the candidate list is an important, yet not exclusive feature. Catalisti’s budget and functioning has been approved by the Flemish authorities based on these previously negotiated strategic programmes. Moreover, Catalisti is expected to also actively work on the transversal priorities set by the Flemish Government (e.g., industry 4.0, Vlaanderen Circular). The fact that the chemicals sector mandates special attention is of course a top-down policy choice by the Government.</p> <p>About the content and types of projects within these programmes, Catalisti is fully in charge, and it develops its own Roadmaps (fully bottom-up). This industry-business driven approach is fully integrated into the way projects are managed and conceived. Catalisti does not publish calls for tender; companies can approach Catalisti whenever they are ready and at any stage in the project (from embryonic idea development and searching for partners to evaluation of the with VLAIO</p> <p><b>Q: Origin of the initiative (public, private, non-profit, academic)</b> Public-Private Partnership</p>
<p><b>Categorisation of tool/mechanism</b></p>	<p><b>Q: How does your structure support substitution (financial/non-financial support)? Specify what non-financial support consists of (e.g., information-sharing, training, networking).</b></p> <p>Individual services, funding, project assistance, meetings and networking, information and knowledge transfer, business support and internationalisation (more detailed description above).</p> <p><b>Q: What is the geographical scope of the tool/mechanism</b> A: Flanders</p>

	<p><b>Q: Which industry sectors are targeted?</b> The various subsectors in the chemical and life-sciences sector</p>
<b>Eligibility</b>	<p><b>Q: Who is eligible/who can benefit from the support tool?</b> All companies, research institutes based in Flanders</p> <p><b>Q: Brief description of the process to access the tool/participate</b> See above</p> <p><b>Q: Are their specific restrictions to benefits provided by the support tool?</b> A project must have at least 3 private business partners. VLAIO rules and funding mechanisms must be respected.</p> <p><b>Q: In case of financial support, what degree of funding can be foreseen?</b> Rules of the VLAIO funding mechanisms apply.</p>
<b>Cooperation (cross-regional, cross-border, cross initiatives)</b>	<p><b>Q: Does the support tool/mechanism cooperate with other mechanisms/entities?</b> Yes</p> <p>Interregional cooperation started with Greenwin, the Walloon clusters for chemicals and life sciences, VLAIO, Innoviris and DG 06 SPW. To facilitate approval and cooperation between companies and research institutions in the various regions. For an interregional project, ., Wallonia evaluates the 'Walloon' component whilst VLAIO evaluates the Flemish component. This is inspired by the BelSME programme which is already organised for SME support.</p> <p>Cross-border support also exists with the Netherlands, Nordrhein-Westfalen and Rhône-Alpes.</p> <p>Catalisti has been actively involved in developing the BlueChem business plan and now sits as observer in the Board and can provide technical support.</p>
<b>Qualitative assessment of the tool/mechanism</b>	<p><b>Q: What are the perceived advantages of the tool? (via reporting or interviews)</b> Spearhead clusters are seen by all actors involved as a very important means to steer innovation in the chemicals sector. There are enough financial resources made available and they increase every year.</p> <p><b>Q: Is there room for improvement? Please specify on which aspects and to what extent? (via interviews)</b> The costs related to testing are a bottle-neck--certainly for SMEs but also for large companies. More financial support is needed to bring applications to market (e.g., cost related to REACH dossier). This reaches the boundary of state aid rules defined by the EU (no financial support to compliance activities). Nevertheless, certain provisions can be interpreted in different ways by MS: a more flexible interpretation of this limitation may overcome this obstacle.</p> <p><b>Q: Examples of success of the tool (via interviews essentially)</b> Projects run on SVHCs</p>

	<ul style="list-style-type: none"> <li>• <b>Maia: Manufacturing of Advanced &amp; Innovative Bio-Aromatics</b> Replacement of BPA from renewable sources by utilizing the natural functionality of biomolecules by catalytically converting waste food into lignin fractions and a solid cellulose pulp.</li> <li>• <b>Freefoam: Functional Reach Compliant, Ecologically and Economically Responsible Foaming of Polymer Products</b> Replacement of ADCA (Azodicarbonamide): initiative to research available alternatives.</li> <li>• <b>Froptiplast: Flame Retardants for Optimal Plastic Applications:</b> compile and inventory of the available flame retardants and their usefulness, inventory the research landscape, inventory the related regulations (regional and EU), develop a methodology to help companies comply with requirements of legislation.</li> </ul>
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**IX.1.4. VARIO**

Theme	Questions/Answers
Description of the tool/mechanism	<p><b>Q: Objective, background</b></p> <p>The Flemish Advisory Council for Innovation and Enterprise (Vlaamse Adviesraad voor Innoveren en Ondernemen or VARIO) was established by the Flemish Government in October 2016.</p> <p>VARIO advises the Flemish Government and the Flemish Parliament on its science, technology, innovation, industry and entrepreneurship policy. The council does this on its own initiative as well as on request.</p> <p>VARIO works independently from the Flemish Government and the Flemish stakeholders on issues related to science, innovation, industry and enterprise.</p> <p>VARIO provides advice along the entire innovation chain, from non-focused scientific research at the universities and application-oriented research with a view to valorisation to the transformation of the industry and services sectors and Flemish entrepreneurship.</p> <p><b>Q: Structure of the tool and resources available (HR + financial envelope for operating)</b></p> <p>Advisory function</p> <p><b>Q: Origin of the initiative (public, private, non-profit, academic)</b></p> <p>Public</p> <p><b>Q: Has the tool/mechanism undergone substantial changes over time? If so, please explain, including the rationale behind the change.</b></p> <p>VARIO is the successor of the Flemish Council for Science and Innovation or VRWI. From 2010 to 2016, the VRWI was the strategic advisory body of the Flemish Government for science and innovation. In turn, the VRWI was the successor of the Flemish Science Policy Council or VRWB, which was active from 1985 to 2009.</p>

<p>Categorisation of tool/mechanism</p>	<p><b>Q: How does your structure support substitution (financial/non-financial support) Specify what non-financial support consists of (e.g., information-sharing, training, networking).</b>                  Non- financial: advisory function, provide strategic advice to policy-makers</p> <p><b>Q: What is the geographical scope of the tool/mechanism?</b>                  Flanders</p> <p><b>Q: Which industry sectors are targeted?</b>                  Entrepreneurship generally                  A specific strategy was developed for the Flemish Space Industry.</p>
<p>Eligibility</p>	<p><b>Q: Who is eligible/who can benefit from the support tool?</b>                  Decision-makers, stakeholders and the larger public (via publications)</p> <p><b>Q: Brief description of the process to access the tool/participate</b>                  Access to advice and publications via the website <a href="https://www.vario.be/en/publications">https://www.vario.be/en/publications</a></p> <p><b>Q: Are their specific restrictions to benefit from the support tool?</b> N/A</p> <p><b>Q: in case of financial support, what degree of funding can be foreseen?</b>                  N/A</p>
<p>Cooperation (cross-regional, cross-border, cross initiatives)</p>	<p><b>Q: Does the support tool/mechanism cooperate with other mechanisms/entities?</b>                  N/A</p> <p><b>Q: Specify which ones and how this cooperation materializes.</b>                  N/A</p>
<p>Qualitative assessment of the tool/mechanism</p>	<p><b>Q: What are the perceived advantages of the tool?</b>                  Providing input to shape policy</p> <p><b>Q: What are the perceived disadvantages or shortcomings of the tool?</b>                  N/A</p> <p><b>Q: Is there room for improvement? Please specify on which aspects and to what extent?</b>                  A: N/A</p>

## IX.2. Wallonia

### IX.2.1. GREENWIN

Theme	Questions/Answers
<p>Description of the tool/mechanism</p>	<p><b>Q: Objective, background</b>                  GreenWin is one of the six triple helix (gathering the industry, research bodies and public bodies) innovation clusters conceived by the Walloon Government in Belgium. Its mission is to promote innovation in environmental technologies and to foster the development of ambitious collaborative projects in R&amp;D, industrial investment or skills development,</p>

	<p>with an objective of economic growth for industrial members and of job creation in Wallonia.</p> <p>Greenwin’s activities focus on three leading markets:</p> <ul style="list-style-type: none"> <li>• Sustainable chemistry, including CO<sub>2</sub> transformation, into a variety of value-added products, process intensification and white biotechnologies</li> <li>• Sustainable materials for the construction sector production of building materials or building systems with reduced environmental impact, energy efficiency and energy storage solutions, etc</li> <li>• Environmental technologies: waste treatment and recycling, water and air treatment, soil remediation, sludge recovery.</li> </ul> <p>Greenwin functions quite similarly to Catalisti.</p> <p><b>Q: Structure of the tool and resources available (HR + financial envelope for operating).</b></p> <p>Every year, the Walloon Government launches a call for projects for the competitiveness clusters. GreenWin plays a key role in the emergence of new projects in close collaboration with the Walloon administration and university. It ensures the following activities:</p> <ul style="list-style-type: none"> <li>• The organization of calls for projects</li> <li>• Networking / partner identification</li> <li>• Assistance in structuring the project</li> <li>• Identification of funding sources (e.g., competence centres, EU)</li> <li>• Accompanying the project at all stages of development until the submission of projects to the Walloon Region (intellectual property, market study, etc.)</li> <li>• The management of the evaluation process and project selection an International Jury</li> <li>• Training (e.g., valuation, intellectual property management, life-cycle analysis)</li> <li>• The co-financing of the market study</li> </ul> <p>Projects selected by the GreenWin cluster are then evaluated by the Jury of the Walloon Government after verification of the eligibility of the files by the administration.</p> <p><b>Q: Origin of the initiative (public, private, non-profit, academic)</b></p> <p>Public-Private Partnership</p>
<p>Categorisation of tool/mechanism</p>	<p><b>Q: How does your structure support substitution (financial/non-financial support)? Specify what non-financial support is provided (e.g., information-sharing, training, networking)</b></p> <p>Financial and information-sharing, training, networking, etc.</p> <p>The cluster's working groups (WGs) serve as a means of generating project ideas. These groups are places of reflection open to all participants, including non-members of the cluster. During working groups meetings, the cluster informs attendees about the R &amp; D strategic agendas of the European Commission and the international domain (e.g., ETP, PPP, KIC,</p>

	<p>EIP). Participants are invited to respond to these topics and to propose project ideas. The following working groups have come together since the cluster launched:</p> <p>Within the 3 strategic business areas of the cluster, GreenWin deals with the following topics:</p> <p>Area 1: Sustainable chemistry</p> <ul style="list-style-type: none"> <li>• Biosourced chemistry</li> <li>• CO2 chemistry</li> <li>• biotechnology</li> </ul> <p>Area 2: Materials &amp; Sustainable Construction</p> <ul style="list-style-type: none"> <li>• Sustainable materials</li> <li>• Storage and energy efficiency</li> <li>• Construction system</li> </ul> <p>Area 3: Environmental Technologies</p> <ul style="list-style-type: none"> <li>• Recycling</li> <li>• Soil remediation and sediment processing</li> <li>• Water and sludge, air quality and emissions</li> </ul> <p>These working groups also promote Partnership Events (PEs) where individuals with innovative ideas can briefly present their idea to an audience of potential partners selected by the cluster. Each project idea is then debated in brainstorming session in order to create an embryo consortium. Two partnership events were organized: one on water and the other on bitumen.</p> <p>The working group agenda is prepared by a sub-group (GAR) composed of 2 or 3 members of the cluster, a representative of the operational unit and is chaired by a company representative. This GAR proposes the WG topics and develops an attendee invitation list.</p> <p><b>Q: What is the geographical scope of the tool/mechanism?</b> Wallonia</p> <p><b>Q: Which industry sectors are targeted?</b> Environmental technology including construction, chemicals, biotech, energy</p>
<p>Eligibility</p>	<p><b>Q: Who is eligible/who can benefit from the support tool?</b></p> <p>Greenwin brings together in a single network more than 200 partners, including over 155 companies--including several world leaders, universities, research centres, training operators and communities, all of which are involved in developing the green economy and motivated by the opportunities resulting from pooling skills and sharing resources.</p> <p>GreenWin has a robust operations unit based on a network of experts in direct contact with all the parties involved in sustainable development. Its permanent structure allows for effective control. GreenWin offers a made-to-measure confidential service.</p> <p>GreenWin provides to its partners:</p> <p>1. PROSPECTIVE:</p>

	<ul style="list-style-type: none"> <li>• Organization of working groups, on themes identified as priorities by the cluster and / or centred on the needs of partners</li> <li>• Strategic technology watch</li> <li>• Visibility and international support through business missions, networking activities, identification of international partners and financing sources</li> </ul> <p>2. PARTNERSHIPS:</p> <ul style="list-style-type: none"> <li>• Privileged access to the competences of the universities departments (UCL, ULB, ULg, UMons, UNamur) and research canterers</li> <li>• Networking platform with the most relevant industry partners based on identified needs</li> <li>• Privileged access to the international partners (e.g., clusters, federations, business associations)</li> </ul> <p>3. SETTING UP THE PROJECTS:</p> <ul style="list-style-type: none"> <li>• Support for the developing f ambitious collaborative projects (e.g., innovation, training, investment, technological platform, prototyping) from ideation to valorisation</li> <li>• Designating projects for their financing by the “Marshall Plan”</li> <li>• Support in the search of additional funding</li> <li>• Development of shared technology platforms to meet shared needs</li> </ul> <p>4. TRAINING: Identification of strategic skills that need to be developed and implementation of collective training actions</p> <p>5. EVENTS: Access to all the events is reserved for partners at preferential pricing.</p> <p><b>Q: Brief description of the process to access the tool/participate.</b></p> <p><u>Filing letters of intent</u></p> <p>The Letter of Intent is a 2-page document that informs the cluster of your project idea. This document can be submitted to the operational unit of the cluster throughout the year.</p> <p><u>Orientation meeting</u></p> <p>The project leader will present his project to the GreenWin team and experts. This orientation meeting will confirm the potential of the project or reorient it to other funding. A series of recommendations will be submitted for the drafting of the project.</p> <p>Following the advice given at the orientation meeting, the cluster's Governance Council will provide an opinion on the preliminary draft in the current call.</p> <p><u>Submission of draft + Ruling</u></p> <p>The draft is a document of about fifteen pages that breaks the project down into its major tasks, estimate the funding level by the Region and finalizes the composition of the consortium.</p>
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	<p>Following submission of the draft, DGO6 will provide its ruling, which will analyse the project eligibility and provide additional recommendations.</p> <p><u>Submission of the project form</u></p> <p>The complete file (including a market study) is given to GreenWin for evaluation by a jury of international experts.</p> <p><u>Project Selection Meeting</u></p> <p>The consortium will present the project to a panel of international experts. The jury will make recommendations for improvement before the final submission.</p> <p>Following the opinion issued by the Jury, the Board of Governance of the cluster will give a final opinion on the project in the current call.</p> <p><u>Submission of the final form to the Walloon Government</u></p> <p>The consortium adds the comments of the International Jury to the final submission package given to Government Jury.</p> <p><b>Q: Are their specific restrictions to benefit from the support tool?</b> N/A</p> <p><b>Q: In case of financial support, what degree of funding can be expected?</b> N/A</p>
<p>Cooperation (cross-regional, cross-border, cross initiatives)</p>	<p><b>Q: Does the support tool/mechanism cooperate with other mechanisms/entities?</b> Yes</p> <p><b>Q: Specify which ones and how this cooperation materializes.</b> Interregional cooperation with Catalisti, Innoviris, VLAIO and DG06 SPW</p>
<p>Qualitative assessment of the tool/mechanism</p>	<p><b>Q: What are the perceived advantages of the tool? (via reporting or interviews)</b> N/A</p> <p><b>Q: What are the perceived disadvantages or shortcomings of the tool?</b> N/A</p> <p><b>Q: Is there room for improvement? Please specify on which aspects and to what extent? (via interviews)</b> N/A</p> <p><b>Q: Examples of success of the tool (via interviews essentially)</b> N/A</p>

## IX.2.2. SPW – RECHERCHE ET INNOVATION

### Portail de la Recherche et de l'innovation - CWality

The CWality program aims to support the development and validation of products, processes, industrial design or new services (PPS) intended to Provide near-term economic value to partner companies.

- The applicant must be a company;
- The project should be experimental development aiming to develop new products, processes, industrial design or services, or to bring about a significant improvement of products, processes, industrial design or existing services. Incremental innovation will be favoured. The project may include the creation of complex system components, including prototypes, useful for validating implemented technologies;
- The submitted project must be innovative.
- The project will have to provide a business plan:
  - an economic feasibility study specifying how the project will contribute to the development of the company (conducted internally or externally),
  - a market study assessing if the targeted PPS is well positioned in relation to the company (core-business, strategy, means of production, distribution channels) and in relation to the market (positioning, competition, demand, accessibility, regulatory barriers).

#### Eligible entities/conditions

- The partnership includes a single company with a head office in Wallonia and at least one research centre (accredited or backed by a high school);
- The research consortium has a maximum of three partners
- The promoter is a company
- The research has not already been publicly funded
- The overall budget, with the exception of demonstration and prototyping costs, is distributed between the company and the research centre(s) according to a distribution key of maximum 70%- 30% for one or the other party if the promoter is an SME, or 60% - 40% if the promoter is a large company.

The selection procedure is organized into three steps:

- **Step 1: Eligibility**  
The eligibility of each detailed proposal is examined by the Administration.
- **Step 2: Evaluation**  
The Administration, with the help of independent experts, evaluates projects submitted based on of the criteria. The Administration may also call on independent experts. Projects must score at least 70% for each of the three evaluation criteria. The Administration sends the selection board its opinion on the eligibility of the projects and all the elements related to the evaluation of all the projects.
- **Step 3: The Jury**  
The selection jury is composed of a representative of the Minister of Research, a representative of the Minister of Economy, four representatives of the "Scientific Policy" cluster of the Economic and Social Council of Wallonia, seven thematic specialists and

three representatives of the Administration. After deliberation based on the assessments submitted, the selection jury submits a proposal for the classification of the projects to the Minister of Research, who will decide on the financing of the projects. Any conflict of interest is strictly prohibited within the Selection Jury. Strict confidentiality is guaranteed within the Jury. Clauses and procedures preventing any conflict of interest and ensuring the confidentiality of documents and discussions are defined in internal regulations.

### Portail de la Recherche et de l'innovation – Industrial research

The funding level for Industrial Research Grant varies between 30% and 80% of eligible expenses, depending on the type of company and the characteristics of the project.

Eligible research expenses are:

- Personnel costs for researchers, technicians and other support staff, to the extent that they are assigned to work on the project;
- The costs of instruments and equipment required for completion of the project;
- The costs of contract research, technical knowledge and patents acquired through external licensing (at market price) and the costs of consulting and equivalent services used in the project;
- Additional overhead costs incurred directly as a result of the project;
- Other operating expenses, including costs of materials, supplies and similar products, incurred directly as a result of the project.

#### Intervention criteria

- The innovative nature of the project, its contribution to scientific progress in terms of acquisition of new knowledge;
- The quality of the project, its technical feasibility and its relevance to the socio-economic needs of the Region.
- The company must be able to economically enhance the expected results of the project, e.g., provide economic benefits, tap into an existing lucrative market and demonstrate the ability to penetrate this market, demonstrate prospects for exploitation of intellectual property rights.
- The company must contribute to sustainable development, as defined by the decree of 27 June 2013 on the Walloon sustainable development strategy, considering the short- and long-term social, environmental and economic impacts.
- The company must have the financial capacity to carry out the activities and to exploit the expected results.
- The project must have a clear degree of risk (cost of the project in relation to the company's turnover, time of development of the new product or process, expected benefits in relation to the cost of the project).
- The funding leverage effect.

### Portail de la Recherche et de l'innovation – Experimental development

This programme funds experimental development. One-company applicants can be awarded only a repayable advance (sort of loan). Collaboration of two or more companies may receive either a grant or a repayable advance.

Funding level varies between 35% and 70% of eligible expenses depending on the type of company and the characteristics of the project.

Eligible research expenses are:

- Personnel costs for researchers, technicians and other support staff commensurate with their involvement on the project;
- Costs of required project instruments and equipment;
- The costs of contract research, technical knowledge and patents acquired through external licensing (at market price) and the costs of consulting and equivalent services used on the project;
- Additional overhead costs incurred directly as a result of the project;
- Other operating expenses, including costs of materials, supplies and similar products, incurred directly as a result of the project.

Evaluation criteria:

- The innovative nature of the project and its contribution to scientific progress in terms of acquisition of new knowledge.
- The quality of the project, its technical feasibility and its relevance to the socio-economic needs of the Region.
- The company must be able to economically enhance the expected results of the project, e.g., provide economic benefits, tap into an existing lucrative market and demonstrate the ability to penetrate this market, demonstrate prospects for exploitation of intellectual property rights.
- The company must contribute to sustainable development as defined by the decree of 27 June 2013 on the Walloon sustainable development strategy, considering the short- and long-term social, environmental and economic impacts.
- The company must have the financial capacity, to complete the activities and exploit the expected results.
- The project must demonstrate clearly the risks and benefits it offers to the company (cost of the project in relation to the company's turnover, time of development of the new product or process, expected benefits in relation to the cost of the project).
- The funding leverage effect.

### Portail de la Recherche et de l'innovation – FIRST

The First Enterprise Program funds a researcher and provides training through an internship within

- a University Research Unit,
- an approved Research Centre,
- a Research Centre associated with a High School (organizing long-term technical and agricultural studies at the university level),

- or a public research organization.

The First International Business Program allows a company to hire a researcher to conduct research and provide training through an internship within

- a research centre established in a Member State of the European Union,
- or in a research centre established outside the European Union as part of a Walloon - host country cooperation agreement (the list is available on request from DGO6).

The First Company Doctor Program allows a company to hire a researcher (Doctor of Sciences, Applied Sciences, Agricultural Sciences, Medicine or Veterinary Medicine) to conduct research and transfer knowledge to the company through an internship within

- a University Research Unit,
- an approved Research Centre,
- a Research Centre associated with a High School (organizing long-term technical and agricultural studies at the university level)
- or a public research organization.

Eligible expenses include:

- the salary burden of the researcher;
- overhead costs corresponding to 10% of the researcher's salary;
- an amount of 5,000 euros per semester to the host organization partner.
- For First International Business, travel and subsistence expenses in the host country.

#### Portail de la Recherche et de l'innovation – Doctoral programme in Business

The Doctoral Program in Business allows a company to hire a researcher to conduct a doctoral research in collaboration with a university research unit.

Eligible expenses include:

- the salary burden of the researcher;
- fixed operating and coordination costs for the company (up to € 10,000 per semester);
- overhead costs corresponding to 10% of the total salary of the researcher plus fixed operating costs;
- a fixed operating and coordination fee for the university unit (up to € 10,000 per semester);
- any subcontracting costs to an approved research centre;
- possible mission expenses abroad.

The part covered by the Walloon Region is:

- Small business: 70% subsidy
- Medium-sized enterprise: 60% subsidy
- Large company: 50% subsidy

The project has a duration of 48 months, divided into two phases of 24 months, with evaluation between the two phases (24 months possible in certain cases)

### Portail de la Recherche et de l'innovation – Prototyping

This programme supports experimental development projects designed to develop a marketable prototype. Sole applicants can benefit from a repayable advance (sort of loan). Collaboration of two or more companies can receive either a repayable advance, or a grant.

Aid levels vary between 35% and 70% of eligible expenses depending on the type of company and the characteristics of the project.

Eligible research expenses are:

- Personnel costs for researchers, technicians and other support staff for their work on the project;
- Costs of instruments and equipment implementing the project;
- The costs of contract research, technical knowledge and patents acquired through external licensing (at market price) and the costs of consulting and equivalent services used for the project;
- Additional overhead costs incurred directly as a result of the project;
- Other operating expenses, including costs of materials, supplies and similar products, incurred directly as a result of the project.

The criteria for evaluating the application are as follows:

- The innovative nature of the project and its contribution to scientific progress;
- The quality of the project, its technical feasibility and its relevance to the socio-economic needs of the Region.
- The company must be able to economically enhance the expected results of the project, e.g., provide economic benefits, tap into an existing lucrative market and demonstrate the ability to penetrate this market, demonstrate prospects for exploitation of intellectual property rights.
- The company must contribute to sustainable development, as defined by the decree of 27 June 2013 on the Walloon sustainable development strategy, considering the short- and long-term social, environmental and economic impacts.
- The company must have the financial capacity to conduct the project activities and to exploit the expected results.
- The project must demonstrate clearly the risks and benefits it offers to the company (cost of the project in relation to the company's turnover, time of development of the new product or process, expected benefits in relation to the cost of the project).
- The funding leverage effect.

### Portail de la Recherche et de l'innovation – OP-In

This programme supports

- Process innovation: consisting of setting up production or distribution operations with the objective of increasing the added value produced.
- Organizational innovation: consisting in the establishment of human resource management innovations involving the workplace and both internal and external actors; the objective would be to increase the added-value produced by the organization.

Aid levels vary between 15% and 50% of eligible expenses depending on the type of company and the characteristics of the project.

Eligible research expenses are:

- Personnel costs for researchers, technicians and other support staff for their contribution to the project;
- Costs of instruments and equipment required for the project; these costs should be calculated according to the expected equipment/instrument lifespans, the period of their use on the project and annual depreciation rate based on current good accounting practices.
- The costs of contract research, technical knowledge and patents acquired through external licensing (at market price) and the costs of consulting and equivalent services used in the project;
- Additional overhead costs incurred directly as a result of the project;
- Other operating expenses, including costs of materials, supplies and similar products, incurred directly as a result of the project.

The criteria for evaluating the application are as follows:

- The innovative nature of the project,
- The quality of the project, its technical feasibility and its relevance to the technical and economic aspects of the Region,
- The company must be able to value the expected results/benefits of the project.
- The project must provide significant contribution to sustainable development.
- The company must be able to meet the current and foreseeable financial needs of the project or have the possibility of finding the additional financing corresponding to these needs.
- The project must have an obvious degree of risk.
- The project must present a novelty or a significant improvement over the state of the art in the relevant sector within the European Union.
- A qualified project manager is identified.
- Innovation is potentially transferable to other areas.
- If the project relates to organizational innovation, it must focus on an innovation related to the use or exploitation of information and communication technologies to modify the organization.

### Portail de la Recherche et de l'innovation – Infrastructure

The Business Infrastructure Program finances collective infrastructures between companies. It is open to SME-SME or large company-SME consortia and aims to promote the technological, scientific and technical developments of SMEs.

The objective is to finance research infrastructure. In this context:

- The research deliverable should be a remarkable research infrastructure that can be used by companies to conduct research in their areas of expertise.
- The proposed project must have a remarkable technological character aligned with the needs of the consortium and other potential users duly identified (the potential to make it to transfer technology and make it to market launch must be justified).
- The consortium must include at least two companies, at least one of which is a SME. Therefore, large companies must submit a project in cooperation with an SME.

The budget submitted must meet the following conditions:

- The project total budget must be between 500,000 euros and 2 million euros
- At least 70% of the project total budget must be devoted to acquisition of remarkable infrastructure (heading 4 of the eligible expenditures defined below);
- Each partner's share of the total budget cannot exceed 70%.
- Each partner's portion of the budget devoted to the acquisition of the infrastructure may not exceed 70% of the total budget dedicated to acquisition (heading 4 of the eligible expenditures defined below).
- Access to the infrastructure is open to multiple users on a transparent, non-discriminatory and sustainable basis.
- The infrastructure will be justified in relation to its potential for use and its potential for creating a large Walloon industrial consortium around it. The arrangements for pooling use of the infrastructure will have to be defined through the development of a utilization plan and the conditions for providing access to users outside the consortium will be made public.

#### Financing terms:

The contribution covered by the Walloon Region is:

- Small Business: 50% grant
- Medium-sized enterprise: 50% grant
- Large company: 30% grant

## IX.3. Brussels

### Innoviris

#### Innoviris Boost

The Boost programme targets small companies based in Brussels-Capital. It enables them to: access funding quickly and at a low cost; engage the competences of a research centre in order to have an innovative idea validated; or to benefit from occasional expert assessment to support an innovative project.

Innoviris offers the candidate company financial aid for performing this short-term technical service in a research centre.

#### Eligible entities:

- Very small or small enterprise
- Develop all or some of their activities within the territory covered by the Brussels-Capital Region
- Show that the scientific research or experimental development project for which the Boost aid is sought is likely to have a favourable impact on the economy, employment and/or sustainable development of the Brussels-Capital Region
- Demonstrate the company's ability to finance its share in the study's costs.
- Have fulfilled its obligations in the context of previous support initiatives allocated to it by the Region.

Applications may be submitted to Innoviris at any time during the calendar year using the form available on the website in French and Dutch.

In order to be eligible, the aid applications must be submitted to Innoviris by research centres before the start of the project.

Financial aid is allocated as a grant. The grant is limited to €10,000 per year per company and covers it covers a maximum of 75% of the project costs (excl. VAT) related to the study, as described in the application. The study covers a maximum period of one year.

#### Innoviris Connect

Under the Connect Program, funding is allocated to Brussels stakeholders preparing a European RDI project (research, development and innovation). It funds Brussels entities preparing a collaborative project with one or several European entities with a goal of obtaining funding or recognition from a European or supranational organisation (e.g. Horizon 2020, Eureka)

#### Eligible entities:

- SME developing all or some of its activities within the territory covered by the Brussels-Capital Region,
- promoter of or a participant in a scientific research, experimental development or innovation project (in associate with at least one European foreign entity) which will be submitted to a European body and carry out RDI activities within the EU,
- show that the project is likely to have a favourable impact on the economy, employment and/or sustainable development of the Brussels-Capital Region, demonstrate the company's ability to finance its share in the project, and have fulfilled its obligations in the context of previous support initiatives allocated by the Region.

Funding can cover 50%-70% of the project total budget.

### Innoviris Explore Industrial Research

Through the Explore programme, Innoviris finances industrial research projects. Industrial research is defined as all actions, critical surveys and planned work performed to acquire new skills and scientific knowledge in order to develop a product, process or service later.

#### Eligible entities:

- The company(ies) develops all or some of its activities within the territory covered by the Brussels-Capital Region
- Involves an innovative industrial research project
- Shows that the project is likely to have a favourable impact on the economy, employment and/or sustainable development of the Brussels-Capital Region
- Demonstrates that the company(ies) have enough capacity/resources to finance its share in the project
- The company(ies) has fulfilled its obligations in the context of previous support initiatives allocated by the Region.

Financial aid is allocated as a grant:

- for micro enterprise/small enterprise: 70%,
- for medium enterprises: 60%,
- for large enterprises: 50%.

These basic rates may be increased by 15% in the case of actual cooperation with another Belgian or foreign company, or a research organisation. The rate of funding assistance is limited to 80% of the total project budget.

### Innoviris Launch

The Launch programme supports creation of new companies (spin-offs) in the Brussels-Capital Region in order to economically promote the results of scientific research. It provides financial support for projects whose objectives are:

- To study the conditions of the industrial and commercial implementation of the results obtained with a view to the creation of a new economic activity in the Brussels-Capital Region.
- To finalise the development of a product, process or innovative service based on the results obtained during earlier research;

Those able to benefit from Launch aid are companies and collective research centres which meet the following conditions:

- develop all or some of its activities within the territory covered by the Brussels-Capital Region;
- present a project aimed at finalising development of a product, process or innovative service based on the results obtained during earlier research;
- the project must be supported by a researcher-entrepreneur who holds a high-level teaching diploma and by a promoter who is responsible for research in the applicant company or collective research centre;

- show that the project is likely to lead to economic development through the creation of a company;
- show that the project is likely to have a favourable impact on the economy, employment and/or sustainable development in the Brussels-Capital Region;
- demonstrate the ability to finance the company's share in the project;
- have fulfilled its obligations in the context of previous support initiatives allocated by the Region.

The evaluation criteria are as follows:

- project innovative character and scientific quality;
- the project's feasibility (technological and scientific risks to overcome, methodology and planning);
- the candidate's entrepreneurial spirit (the candidate's ability to undertake all the tasks needed to launch the spin-off);
- the candidate's supervision (research environment, promoter's competences, profiles and involvement of any sponsors);
- the economic potential (response to a demand from the targeted sector, feasibility of the promotion plan, value creation and employment in the Brussels-Capital Region).

Financial aid is allocated as a grant. It covers a period of two years. This period may be extended by one year. For micro enterprises/small enterprises, the grant may fund up to 45% of the total project budget; for medium enterprises the limit is 35%; for large enterprises it is 25%; and for collective centres it is 75%.

### Innoviris Start

The new Start programme focuses on the technical (proof of concept) and business validation (proof of business) of future projects and services. Start also provides opportunities for successful applicants to present their working hypotheses to professional experts and established CEOs.

The aim of the new Start programme is two-fold:

- Demonstration of the business relevance associated with the development of an innovative product/service
- Demonstration of the successful integration of this product/service within the overall strategy of a company, with the aim of growth and sustainability.

A company may benefit from Start aid if it fulfils the following conditions:

- the project aims to develop a first technologically innovative product/service
- The company conducts all or some of its activities within the territory covered by the Brussels-Capital Region
- The project is likely to have a favourable impact on the economy, employment and/or sustainable development of the Brussels-Capital Region
- The proposal/submittal justifies the leverage effect of the grant on the implementation of the proposed work programme
- Demonstrates the ability of the company to finance its share in the project
- The company has fulfilled its obligations in the context of previous support initiatives allocated by the Region

The financial aid is allocated as a grant. The grant covers 50 to 70% of the total project budget up to a maximum of 100,000 euros. for a period between 3 to 9 months. The funding level depends on the size of the applicant company.

### Innoviris The Rise

The Rise call for projects aims to highlight the most innovative Brussels start-up of the year. This programme aims to reward the best technological company through the allocation of a grant of as much as 100% of the costs related to the implementation of that company's Strategic Innovation Plan (PSI).

This strategic plan enables the company to present its business strategy (R&D, Innovation, Finance, Business Development, etc.) by the drafting a global programme outlining the candidate's RDI vision as well as its innovative projects in the medium and long term. This PSI covers a maximum period of three years.

Through a pre-selection process and face-to-face evaluation by a panel of hand-picked experts, Rise also offers candidate companies the opportunity to defend their vision of the future as well as their technological choices in the field of innovation.

The Rise 2018 call was aimed at small Brussels-based companies, founded after 1 January 2014 and showing high innovative potential. To benefit from Rise, the following conditions must be fulfilled:

- The applicant must be a small company according to the definition provided by the Order of 26 March 2009 or micro, small or medium-sized enterprises according to Commission recommendation 2003/361/EC. The project goal must focus on promoting research, development and innovation. The project evaluation considers the background of the candidate company as well as that of other partner companies involved in the proposed project.
- develop all or some of its activities within the territory covered by the Brussels-Capital Region;
- have been created by the submission deadline and has been created less than five years before obtaining the aid.
- show high innovative potential:
  - either by providing an evaluation from an independent external expert of the company's activity plan which establishes that: the company will, in the near future, develop products, services or processes that are technologically new or substantially improved in comparison to the state of the technique in the target EU sector concerned in the European Community, and which present a technological or industrial risk of failure;
  - or by presenting research and development costs corresponding to at least 10% of the company's total operating costs the preceding three years; in the case of a new company without any financial history, an audit of its financial year in progress, the figures being certified by an external audit may suffice;
- show that its strategic innovation plan is likely to have a favourable impact on the economy, employment and/or sustainable development of the Brussels-Capital Region;
- have fulfilled its obligations in the context of previous support initiatives allocated by the Region.
- never have been selected as an innovative start-up in the Brussels-Capital.

Financial aid in the form of a grant which may cover a maximum of €500,000 per company . This grant may cover all types of costs related to the implementation of the Strategic Innovation Plan for a maximum period of three years.

## IX.4. European level

### IX.4.1. SUBSPORT

Theme	Questions/Answers
<p><b>Description of the tool/mechanism</b></p>	<p><b>Q: Objective, background</b></p> <p>SUBSPORT is a free-of-charge, multilingual platform for information exchange on alternative substances and technologies, as well as tools and guidance for substance evaluation and substitution management.</p> <p>The SUBSPORT web portal aims to be the first entry point for anyone interested in substituting hazardous chemicals, to support companies in fulfilling substitution requirements within EU legislation, as well as being a resource for other stakeholders such as authorities, environmental and consumer organisations, and scientific institutions.</p> <p><b>Q: Structure of the tool and resources available (HR + financial envelope for operating)</b></p> <p>Online portal as well as training sessions (where there are basic concepts provided and tools to help participants get started in substitution processes, understand the different stakeholders involved and their interests, which substances are of most concern, how and where to look for new ideas and alternatives, and get introduced to existing tools used to assess alternatives. The concept has been developed for a 4 hours training session with around 20 participants.</p> <p><b>Q: Origin of the initiative (public, private, non-profit, academic)</b></p> <p>The initiative was developed and is being steered by</p> <ul style="list-style-type: none"> <li>• Kooperationsstelle (KOOP) Hamburg IFE GmbH (Germany, project coordinator) specialises in occupational safety and health and protection of the environment. The main goal of KOOP is to improve development possibilities for companies and their personnel via joint projects and consulting.</li> <li>• ChemSec (Sweden) is a non-profit organisation dedicated to working towards a toxic free environment.</li> <li>• Grontmij (Denmark) is a consultancy company that offers consulting services within the spheres of building, construction, water, the environment, occupational health, energy and industry.</li> <li>• ISTAS (Spain) Instituto Sindical de Trabajo Ambiente y Salud, a self-managed technical foundation within and supported by the Spanish Trade Union Confederation (CCOO) to promote</li> </ul>

	<p>improvement of working conditions, occupational health and safety and environmental protection in Spain.</p> <p>Financial support from 2010-2013 was provided by:</p> <ul style="list-style-type: none"> <li>• LIFE+ Programme of the European Union</li> <li>• BAuA – Federal Institute for Occupational Safety and Health, Germany</li> <li>• Federal Ministry of Agriculture, Forestry, Environment and Water Management, Austria</li> </ul> <p><b>Q: Has the tool/mechanism undergone substantial changes over time? If so, please explain including the rationale behind the change</b></p> <p>N/A</p>
<p><b>Categorisation of tool/mechanism</b></p>	<p><b>Q: How does your structure support substitution (financial/non-financial support) Specify what non-financial support covers (e.g., information-sharing, training, networking)</b></p> <p>The support is non-financial in the form of a free multilingual platform for information exchange on alternative substances and technologies, as well as tools.</p> <p><b>Q: What is the geographical scope of the tool/mechanism</b></p> <p>A: Europe</p> <p><b>Q: Which industry sectors are targeted?</b></p> <p>A: Chemical, textile</p>
<p><b>Eligibility</b></p>	<p><b>Q: Who is eligible/who can benefit from the support tool?</b></p> <p>Anyone</p> <p><b>Q: Brief description of the process to access the tool/participate</b></p> <p>Online portal</p> <p><b>Q: Are their specific restrictions to benefit from the support tool?</b></p> <p>No</p> <p><b>Q: in case of financial support, what degree of funding can be foreseen?</b></p> <p>N/A</p>
<p><b>Cooperation (cross-regional, cross-border, cross initiatives)</b></p>	<p><b>Q: Does the support tool/mechanism cooperate with other mechanisms/entities?</b></p> <p>Yes</p> <p><b>Q: Specify which ones and how this cooperation materializes</b></p> <p>From 2010-2013, Subsport was funded by LIFE+, BAuA and the Federal Ministry of Agriculture, Forestry, Environment and Water Management in Austria. Chemsec has taken over some activities, followed by BAUA, on their own finances, and then the project was abandoned in 2017.</p>
<p><b>Qualitative assessment of the tool/mechanism</b></p>	<p><b>Q: What are the perceived advantages of the tool?</b></p> <p>A: N/A</p> <p><b>Q: What are the perceived disadvantages or shortcomings of the tool?</b></p> <p>A: N/A</p>

	<p><b>Q: Is there room for improvement? Please specify on which aspects and to what extent?</b></p> <p>A: N/A</p>
	<p><b>Q: Examples of success of the tool</b></p> <p>A: N/A</p>

## IX.4.2. CEFIC

Theme	Questions/Answers
<p><b>Description of the tool/mechanism</b></p>	<p><b>Q: Objective, background</b></p> <p>CEFIC (The European Chemical Industry Association runs the <u>LRI (Long-Range Research Initiative) programme</u>, which funds research that address the priority issues of the chemical industry regarding the health and environmental impact of chemicals.</p> <p>LRI also aims to provide proactive scientific advice on which the entire industry and regulatory bodies will draw to respond more quickly and accurately to societal concerns.</p> <p>Providing an improved basis for informed policy-making and an early warning of emerging issues, LRI also helps the industry in its own decision-making, especially during the innovation process, for companies to better understand the issues around introduction of new products or technologies.</p> <p>LRI conducts peer-reviewed transparent research to:</p> <ul style="list-style-type: none"> <li>• Improve risk assessment of chemicals and monitor the effects of chemicals on health;</li> <li>• Understand the environmental factors in human health;</li> <li>• Establish endocrine disruption references;</li> <li>• Coordinate research, data sharing and activities at a European level.</li> </ul> <p>LRI addresses many of the environmental objectives of the EU, including linking environmental factors to health effects; understanding and reducing chemical risks to environment; and improving animal testing in risk assessment.</p> <p>Substitution of chemicals is not a focal area of this initiative.</p> <p><b>Q: Structure of the tool and resources available (HR + financial envelope for operating)</b></p> <p>The External Science Advisory Panel (ESAP) helps shape the LRI programme's strategic direction by providing an analytical outside view of its activities and ensuring it serves both industry and public needs. The specialists on the panel also contribute to the scientific value and relevance of individual projects by providing expert advice and guidance on the research.</p> <p>ESAP is made up of independent scientists from across Europe.</p> <p>Chair: <u>Prof. Ian Kimber</u>, University of Manchester (UK)</p>

	<p><u>Dr. Emilio Benfenati</u>, Mario Negri Institute (Italy)</p> <p><u>Prof. Jacob de Boer</u>, VU University of Amsterdam (The Netherlands)</p> <p><u>Prof. Tom Burns</u>, Uppsala University (Sweden)</p> <p><u>Prof. Lynn Frewer</u>, Newcastle University (UK)</p> <p><u>Prof. Ellen Fritsche</u>, RWTH Aachen &amp; IUF Düsseldorf (Germany)</p> <p><u>Prof. Corrado Ludovico Galli</u>, University of Milan (Italy)</p> <p><u>Prof. Philippe Hubert</u>, Chronic Risk Division, INERIS (France)</p> <p><u>Prof. Colin Janssen</u>, Ghent University (Belgium)</p> <p><u>Prof. Erik Lebret</u>, Utrecht University (The Netherlands)</p> <p><u>Prof. Dr. Greet Schoeters</u>, University of Antwerp (Belgium)</p> <p><u>Prof. Michael Siegrist</u>, ETH Zurich (Switzerland)</p> <p><b>Q: Origin of the initiative (public, private, non-profit, academic)</b>                  CEFIC is a non-profit organization representing the interests of the chemical sector.</p> <p><b>Q: Has the tool/mechanism undergone substantial changes over time? If so, please explain, including the rationale behind the change.</b>                  The initiative was first launched in the US in 1996. It was expanded to Europe.</p>
<p><b>Categorisation of tool/mechanism</b></p>	<p><b>Q: How does your structure support substitution (financial/non-financial support)? Specify what non-financial support covers (e.g., information-sharing, training, networking)</b>                  Financial: Research grants are awarded to scientists who submit viable proposals for projects aimed at meeting the priority research objectives.                  LRI’s Innovative Science Award is a €100,000 annual award that supports promising new research in environmental risk assessment and management or human health. The LRI Innovative Science Award was first introduced in 2004 as a <u>funding opportunity</u> for young scientists based in Europe. Its aim is to <b>stimulate innovative research, to foster ‘out-of-the-box’ thinking and to introduce new approaches that will advance the environmental assessment of hazardous substances.</b></p> <p>In 2018, amongst others the following call was launched: <i>‘Evaluate factors that determine the environmental hazards of microplastics’</i>.</p> <p><b>Q: What is the geographical scope of the tool/mechanism</b>                  EU/International</p> <p><b>Q: Which industry sectors are targeted?</b>                  Scientists</p>
<p><b>Eligibility</b></p>	<p><b>Q: Who is eligible/who can benefit from the support tool?</b>                  A: Proposals may be submitted by any European or non-European, for-profit or non-profit organization, public or private entities, such as universities, colleges, laboratories, and contract research organizations; units of national and local governments with the necessary laboratory facilities; and research cooperatives.</p>

	<p><b>Q: Brief description of the process to access the tool/participate</b></p> <p>Every year, the LRI programme announces five to ten Requests for Proposals (RfPs) inviting research organizations to respond to the call for research on specific areas.</p> <p>The scientific evaluation and selection of applications for funding are managed by the LRI with the support of a scientific committee provided by <u>ECETOC, the European Centre for Ecotoxicology and Toxicology of Chemicals</u>.</p> <p>ECETOC is a leading industry association for developing and promoting top quality science in human and environmental risk assessment of chemicals. Proposals are assessed against defined criteria, including:</p> <ul style="list-style-type: none"> <li>• Scientific excellence; the best research proposals will be selected for funding.</li> <li>• Expertise of the Investigator</li> <li>• Quality Assurance (QA) and Good Laboratory Practices (GLP) processes</li> <li>• Credentials of the research organisation and project scientists.</li> <li>• Leveraging of other projects or funding related to the LRI project.</li> </ul> <p>After the selection procedure is complete and the winning proposals have been decided, the LRI (with the collaboration of ECETOC) establishes Research Liaison Teams (RLTs) to monitor the scientific quality and progress of the projects.</p> <p><b>Q: In case of financial support, what degree of funding can be expected?</b></p> <p>Project costs are expected to be commensurate with project scope and should not exceed the budget indicated in the Requests for Proposals (RfP). Proposals should include funds necessary to complete the full scope and deliverables, including direct (staff, travel &amp; living expenses, consumables) and indirect costs (overhead).</p> <p>The 2018 project grants ranged between 200.000 and 600.000 €.</p>
<p><b>Cooperation (cross-regional, cross-border, cross initiatives)</b></p>	<p><b>Q: Does the support tool/mechanism cooperate with other mechanisms/entities?</b></p> <p>Every effort is made to build relationships with research programmes, government agencies, academics and non-governmental organizations to support the development of effective regulation for the sound management of chemicals: ECHA, <u>ECETOC, the European Centre for Ecotoxicology and Toxicology of Chemicals</u>, the members of the scientific panel, etc..</p> <p><b>Q: Specify which ones and how this cooperation materializes.</b></p> <p>LRI has contributed at a regulatory level in the areas skin sensitisation and bioaccumulation. In this context, LRI and its network have made key advances with ECHA both in non-testing by read-across and in-vitro testing for skin sensitization. This results in significant animal savings for companies submitting regulatory filing. This was particularly beneficial for low tonnage chemicals for REACH, as well as for internal R&amp;D safety evaluations.</p>

	<p>Additionally, the LRI works closely with ECHA and Member States in the area of environmental bioaccumulation to contribute to the 2015 PBT guidance update.</p> <p>Finally, the LRI’s Endocrine Modulation Steering Group has contributed to the ED impact assessment for the European Commission. This provided useful information for the EC ED community strategy revision. The ED expertise accumulated within the LRI programme has provided for four OECD test guidelines in the past.</p>
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**IX.4.3. COSME**

Theme	Questions/Answers
<b>Description of the tool/mechanism</b>	<p><b>Q: Objective, background</b></p> <p>A: The programme for the Competitiveness of Enterprises and Small and Medium-sized Enterprises (COSME) is improving access to finance for SMEs through two financial instruments that have been available since August 2014. Small and Medium-sized Enterprises (SMEs) are the backbone of Europe’s economy, providing 85% of all new jobs. The European Commission aims to promote entrepreneurship and improve the business environment for SMEs to allow them to realise their full potential in today’s global economy.</p> <p>COSME will support SMEs in the following areas:</p> <ul style="list-style-type: none"> <li>• Facilitating access to finance</li> <li>• Supporting internationalisation and access to markets</li> <li>• Creating an environment favourable to competitiveness</li> <li>• Encouraging an entrepreneurial culture</li> </ul> <p><b>Q: Structure of the tool and resources available (HR + financial envelope for operating).</b></p> <p>A: COSME provides access to finance, improved framework conditions for enterprises and access to markets, and it encourages entrepreneurship and entrepreneurial culture.</p> <p><b>Q: Origin of the initiative (public, private, non-profit, academic).</b></p> <p>A: Public</p>
<b>Categorisation of tool/mechanism</b>	<p><b>Q: How does your structure support substitution (financial/non-financial support)? Specify what non-financial support covers (e.g., information-sharing, training, networking).</b></p> <p>A: Financial and information-exchange</p> <p><b>Q: What is the geographical scope of the tool/mechanism?</b></p> <p>A: Europe</p> <p><b>Q: Which industry sectors are targeted?</b></p> <p>A: SMEs</p>
<b>Eligibility</b>	<p><b>Q: Who is eligible/who can benefit from the support tool?</b></p>

	<p>A: All types of companies of any size and sector, including entrepreneurs, start-ups, micro companies, small and medium-sized enterprises, and larger businesses. A wide range of financing is available: business loans, microfinance, guarantees and venture capital.</p> <p><b>Q: Brief description of the process to access the tool/participate.</b></p> <p>A: Through calls of proposals.</p> <p><b>Q: in case of financial support, what degree of funding can be expected?</b></p> <p>A: COSME has a budget of over 1.3 billion € to fund these financial instruments that facilitate access to loans and equity finance for SMEs where market gaps have been identified.</p> <p>It will be possible to mobilise up to 25 billion € in financing from financial intermediaries via leverage effects. The financial instruments are managed by the European Investment Fund (EIF) in cooperation with financial intermediaries in EU countries.</p>
<p><b>Cooperation (cross-regional, cross-border, cross initiatives)</b></p>	<p><b>Q: Does the support tool/mechanism cooperate with other mechanisms/entities?</b></p> <p>A: Yes</p> <p><b>Q: Specify which ones and how this cooperation materializes.</b></p> <p>A: European Investment Fund</p>

**IX.4.4. COST**

Theme	Questions/Answers
<p><b>Description of the tool/mechanism</b></p>	<p><b>Q: Objective, background</b></p> <p>A: The European Cooperation in Science and Technology (COST) is a funding organisation for the creation of research networks, called COST Actions. These networks offer an open space for collaboration among scientists across Europe (and beyond), and thereby give impetus to research advancements and innovation.</p> <p><b>Q: Origin of the initiative (public, private, non-profit, academic)</b></p> <p>A: Since 1971, COST has received EU funding under the various research and innovation framework programmes, such as Horizon 2020.</p>
<p><b>Categorisation of tool/mechanism</b></p>	<p><b>Q: How does your structure support substitution (financial/non-financial support)? Specify what non-financial support covers (e.g., information-sharing, training, networking)</b></p> <p>A: Financial</p> <p><b>Q: What is the geographical scope of the tool/mechanism?</b></p> <p>A: Europe and beyond.</p> <p><b>Q: Which industry sectors are targeted?</b></p> <p>A: All fields of science and technology (including interdisciplinary and new and emerging fields).</p>
<p><b>Eligibility</b></p>	<p><b>Q: Who is eligible/who can benefit from the support tool?</b></p>

	<p>A: All types of institutions (academia, public institutions, SME/Industry, NGO, European/International organisations, etc.).</p> <p><b>Q: Brief description of the process to access the tool/participate.</b></p> <p>A: COST is bottom-up, which means that researchers can create a network – based on their own research interests and ideas – by submitting a proposal to the COST Open Call. The proposal can be in any science field. COST Actions are highly interdisciplinary and open. It is possible to join ongoing Actions, which therefore keep expanding over the funding period of four years. Actions are multi-stakeholder, often involving the private sector, policymakers as well as civil society. COST funding aims to complement national research funds, and they are exclusively dedicated to cover collaboration activities such as workshops, conferences, working group meetings, training schools, short-term scientific missions, and dissemination and communication activities.</p> <p>A COST Action proposal can be submitted at any time of the year. Proposals are reviewed up to twice a year. The submission, evaluation, selection and approval (SESA) procedure ensures a simple, transparent and competitive evaluation and selection process, in line with COST’s bottom-up, open and inclusive principles.</p> <p>Proposers benefit from a one-stage submission via the e-COST submission tool. The proposal requires completing a few sections online and uploading a technical annex of up to 15 pages.</p> <p>The minimum number of countries included at the proposal stage is seven COST Members. Out of the seven, a minimum of 50% must be Inclusiveness Target Countries.</p>
<p><b>Cooperation (cross-regional, cross-border, cross initiatives)</b></p>	<p><b>Q: Does the support tool/mechanism cooperate with other mechanisms/entities?</b></p> <p>COST Actions are funded via Horizon 2020.</p>

**IX.4.5. LIFE**

Theme	Questions/Answers
<p><b>Description of the tool/mechanism</b></p>	<p><b>Q: Objective, background</b></p> <p>A: The LIFE programme is the EU’s funding instrument for the environment and climate action. LIFE contributes to the implementation, updating and development of EU environmental and climate policy and laws by co-financing projects with European added value. Since its creation in 1992, LIFE has participated in several different funding periods. The current funding period 2014-2020 has a budget of €3.4 billion. The LIFE programme is divided into two sub-programmes, one for environment (representing 75% of the overall financial envelope) and one for climate action (representing 25% of the envelope).</p> <p><b>Q: Structure of the tool and resources available (HR + financial envelope for operating).</b></p> <p>A: The Commission publishes calls for proposals based on the <a href="#">LIFE multiannual work programmes</a>. The application procedure varies</p>

	<p>according to which sub-programme and project a company wishes to apply for.</p> <p>When preparing an application, one should first carefully read the documents of the call for proposals. The conditions laid down in the respective application package are binding on successful applicants. The Commission checks and evaluates proposals against defined criteria. After a review phase, the Commission proposes funding for successful projects based on the available budget.</p> <p>The <a href="#">2018 calls for proposals</a> are currently under evaluation. Next calls for proposals will be published in spring 2019.</p> <p><b>Q: Origin of the initiative (public, private, non-profit, academic).</b> A: Public</p>
<p><b>Categorisation of tool/mechanism</b></p>	<p><b>Q: How does your structure support substitution (financial/non-financial support)? Specify what non-financial support covers (e.g., information-sharing, training, networking)</b> A: Financial</p> <p><b>Q: What is the geographical scope of the tool/mechanism?</b> A: Europe</p> <p><b>Q: Which industry sectors are targeted?</b> A: Environmental, nature and biodiversity</p>
<p><b>Eligibility</b></p>	<p><b>Q: Who is eligible/who can benefit from the support tool?</b> A: Anyone registered in the EU</p> <p><b>Q: Brief description of the process to access the tool/participate</b> A: <b>Environment and resource efficiency:</b> LIFE co-finances projects in the environmental sector, in the areas of air, chemicals, green and circular economy, industrial accidents, marine and coastal management, noise, soil, waste, water, and the urban environment. The programme provides action grants for pilot and demonstration projects to develop, test and demonstrate policy or management approaches. It also covers the development and demonstration of innovative technologies, implementation, monitoring and evaluation of EU environmental policy and law, as well as best practices and solutions. The European Commission is especially interested in finding technologies and solutions that are ready to be implemented in close-to-market conditions, at industrial or commercial scale, during the project duration.</p> <p>The environment sub-programme has a two-stage application procedure: *Submit a concept note of 10 pages. * If the concept advances to the second stage, one can submit the full project proposal based on the feedback from the LIFE programme.</p> <p>In each EU country there is a national contact point (and sometimes several regional contact points) to help you with your application. These national contact points organise information and networking events and proposal writing workshops in the different EU countries.</p> <p><b>Q: Are their specific restrictions to benefit from the support tool?</b></p>

	<p>A: Anyone registered in the EU can make a proposal for LIFE under the sub programmes for environment and climate action.</p> <p>The applicant could be:</p> <ul style="list-style-type: none"> <li>• public body operating under a national government’s authority, e.g., local authority, national administration, etc.</li> <li>• private commercial organisation</li> <li>• private but non-commercial organisation (NGOs, etc.)</li> </ul> <p><b>Q: in case of financial support, what degree of funding can be expected?</b></p> <p>A: Yes, Projects receive a co-funding of up to 55%.</p>
<p><b>Cooperation (cross-regional, cross-border, cross initiatives)</b></p>	<p><b>Q: Does the support tool/mechanism cooperate with other mechanisms/entities?</b></p> <p>A: No</p> <p><b>Q: Specify which ones and how this cooperation materializes.</b></p> <p>A: N/A</p>

**IX.4.6. EUROPEAN INVESTMENT BANK**

Theme	Questions/Answers
<p><b>Description of the tool/mechanism</b></p>	<p><b>Q: Objective, background</b></p> <p>A: The European Investment Bank (EIB) is a major partner for circular economy (CE) investments in the EU. During the last five years the EIB has provided EUR 2.1 billion of co-financing for circular projects with positive impact on sustainable and economic growth, competitiveness and employment.</p> <p>Promoting a circular economy, where the value of products, materials and resources is maintained in the economy for as long as possible and generation of waste minimised, is a key EU policy priority. The EIB joins forces with the European Commission and supports Member States in their transition towards a circular economy by providing finance and advisory services for CE projects.</p> <p>Circular economy projects are generally eligible for EIB financing as they support the following EIB priorities:</p> <ul style="list-style-type: none"> <li>• Climate action and environment – Circular economy projects typically reduce resource consumption and waste generation which results in lower greenhouse gas emissions.</li> <li>• Innovation and skills - Circular economy projects may be innovative in products, production processes or business models.</li> <li>• Small and medium-sized businesses (SMEs) - SMEs play a key role in the transition to a circular economy because they are an important source of innovation and represent over 99% of all businesses in the EU.</li> </ul> <p>More specifically, the circular economy projects need to:</p> <ul style="list-style-type: none"> <li>• substitute virgin materials with secondary materials</li> </ul>

	<ul style="list-style-type: none"> <li>• reduce waste generation in production and consumption by closing material loops</li> <li>• extend the use and life of assets and products</li> <li>• recover value from waste, by-products and wastewater</li> </ul> <p><b>Q: Origin of the initiative (public, private, non-profit, academic).</b> A: Public</p> <p><b>Q: Has the tool/mechanism undergone substantial changes over time? If so, please explain including the rationale behind the change.</b> A: N/A</p>
<p><b>Categorisation of tool/mechanism</b></p>	<p><b>Q: How does your structure support substitution (financial/non-financial support)? Specify what non-financial support covers (e.g., information-sharing, training, networking)</b> A: Financial and advisory (InnovFin)</p> <p><b>Q: What is the geographical scope of the tool/mechanism?</b> A: Europe</p> <p><b>Q: Which industry sectors are targeted?</b> A: Circular economy is one of the key pillars for EIB support.</p>
<p><b>Eligibility</b></p>	<p><b>Q: Who is eligible/who can benefit from the support tool?</b> A: Companies/ SMEs who deal with circular economy projects.</p> <p><b>Q: Brief description of the process to access the tool/participate.</b> A: Through applications.</p> <p><b>Q: In case of financial support, what degree of funding can be expected?</b> A: EIB offers a range of project loans, risk-bearing financial instruments and financial support for funding, as well as financial and technical advisory services. The products range from direct loans for projects with budget of minimum 15million € to indirect credit lines to local banks and other intermediaries, particularly targeting SMEs and midcaps.</p> <p>CE projects with medium to high risk profiles may be accommodated under the European Fund for Strategic Investments (EFSI), InnovFin and other special financial instruments with higher risk-taking potential.</p> <p><u>InnovFin Advisory (IFA)</u> offers specific financial advice on a range of issues (e.g., business models, governance, funding sources) for innovative projects and companies to improve access to funding. IFA also analyses investment conditions, supports the development of thematic investment platforms (funds), and recommends new financing mechanisms and advisory services where needed. Improving access to finance for circular economy projects is one of the key areas analysed under advisory mandates from the European Commission and the Government of Luxembourg.</p> <p><a href="http://www.eib.org/en/projects/pipelines/index.htm">http://www.eib.org/en/projects/pipelines/index.htm</a></p>
<p><b>Cooperation (cross-regional, cross-border, cross initiatives)</b></p>	<p><b>Q: Does the support tool/mechanism cooperate with other mechanisms/entities?</b> A: Yes</p>

	<p><b>Q: Specify which ones and how this cooperation materializes</b> A: EU Commission</p>
	<p><b>Q: Examples of success of the tool (via interviews essentially)</b> A: Please learn about the numerous success stories here: <a href="http://www.eib.org/en/projects/pipelines/index.htm">http://www.eib.org/en/projects/pipelines/index.htm</a></p>

**IX.4.7. INNOVFIN**

Theme	Sub-theme	Questions/Answers
	<b>Description of the tool/mechanism</b>	<p><b>Q: Objective, background</b> A: InnovFin: Under Horizon 2020, the EU Research and Innovation (R&amp;I) programme for 2014-20, the European Commission and the European Investment Bank Group (EIB and EIF) have launched a new generation of financial instruments and advisory services to help innovative firms access financing more easily. Until 2020, "InnovFin – EU Finance for Innovators" offers a range of tailored financial and advisory products for research and innovation by small, medium and large companies and the promoters of research facilities. InnovFin also includes several thematic products addressing the specific financing needs of certain innovative sectors. InnovFin financial products are backed by funds set aside by the EU (under Horizon 2020) and by the EIB Group (from its own resources).</p> <p><b>Q: Structure of the tool and resources available (HR + financial envelope for operating)</b> A: InnovFin aims to facilitate and accelerate access to finance for innovative businesses and other entities in Europe. InnovFin offers financing options tailored to a wide range of clients from small start-ups to large enterprises, universities or public institutions promoting R&amp;I activities.</p> <p><b>Q: Origin of the initiative (public, private, non-profit, academic)</b> A: Public</p>
	<b>Categorisation of tool/mechanism</b>	<p><b>Q: How does your structure support substitution (financial/non-financial support)? Specify what non-financial support consist of (e.g., information-sharing, training, networking).</b> A: Financial</p> <p><b>Q: What is the geographical scope of the tool/mechanism?</b> A: Firms and other entities or projects located in EU Member States and Horizon 2020 Associated Countries are eligible as final beneficiaries. Projects can be located elsewhere if conducted by entities incorporated in any of the 28 EU Member States or in the Horizon 2020 Associated Countries.</p> <p><b>Q: Which industry sectors are targeted?</b> A: R&amp;I</p>
	<b>Eligibility</b>	<p><b>Q: Who is eligible/who can benefit from the support tool?</b> A: Projects, companies, early-stage enterprises, SMEs.</p>

	<p><b>Q: Brief description of the process to access the tool/participate.</b> A: Through applications.</p> <p><b>Q: Are their specific restrictions to benefit from the support tool?</b> A: N/A</p> <p><b>Q: in case of financial support, what degree of funding can be expected?</b> A: InnovFin financing tools cover a wide range of loans, guarantees and equity-type funding, which can be tailored to innovators’ needs. Financing is either provided directly or via a financial intermediary, generally a bank or a fund. The InnovFin SME Guarantee is particularly relevant in our context because it provides guarantees and counter-guarantees on debt financing of between EUR 25 000 and EUR 7.5m in order to improve access to loan finance for innovative small and medium-sized enterprises and small midcaps (up to 499 employees). This facility is being deployed through financial intermediaries. Under InnovFin SME Guarantee, financial intermediaries are guaranteed or counter-guaranteed against a portion of their potential losses by the EIF.</p>
<p><b>Cooperation (cross-regional, cross-border, cross initiatives)</b></p>	<p><b>Q: Does the support tool/mechanism cooperate with other mechanisms/entities?</b> A: Yes</p> <p><b>Q: Specify which ones and how this cooperation materializes.</b> A: This project falls under the European Investment Bank and the European Investment Fund in cooperation with the European Commission under Horizon2020.</p>
<p><b>Qualitative assessment of the tool/mechanism</b></p>	<p><b>Q: What are the perceived advantages of the tool? (via reporting or interviews)</b> A: InnovFin has financed some truly ground-breaking inventions to the tune of EUR 14bn so far. More than 110 projects and over 11,000 small and early-stage enterprises have benefited, ranging from small tech start-ups to large research facilities and circular economy companies.</p> <p><b>Q: What are the perceived disadvantages or shortcomings of the tool?</b> A: N/A</p>

**IX.4.8. M-ERA.NET**

Theme	Questions/Answers
<p><b>Description of the tool/mechanism</b></p>	<p><b>Q: Objective, background.</b> A: M-ERA.NET is an EU funded network which has been established in 2012 to support and increase coordination of European research and innovation programmes and related funding in materials science and engineering. Since 2016 (and until 2021), the M-ERA.NET consortium has contributed to restructuring of the European Research Area (ERA) by operating a single innovative and flexible network of national and regional funding organisations.</p>

	<p><b>Q: Structure of the tool and resources available (HR + financial envelope for operating).</b></p> <p>A: M-ERA.NET provides a central forum where substantial pan-European research funding programmes can be aligned to support the European RTD community. M-ERA.NET aims to address societal challenges and technological needs with an interdisciplinary approach, providing a flexible umbrella structure to cover emerging topics in materials research and innovation, including materials for low carbon energy technologies and related production technologies.</p> <p><b>Q: Origin of the initiative (public, private, non-profit, academic).</b></p> <p>A: Over five years, the M-ERA.NET consortium aims to mobilise substantial national and regional public funding as well as EU funding.</p> <p><b>Q: Has the tool/mechanism undergone substantial changes over time? If so, please explain including the rationale behind the change.</b></p> <p>A: N/A</p>
<p><b>Categorisation of tool/mechanism</b></p>	<p><b>Q: How does your structure support substitution (financial/non-financial support)? Specify what non-financial support is available (e.g., information-sharing, training, networking)</b></p> <p>A: Financial</p> <p><b>Q: What is the geographical scope of the tool/mechanism?</b></p> <p>A: Europe</p> <p><b>Q: Which industry sectors are targeted?</b></p> <p>A: Research/ Innovation/ Material Sciences/ Engineering</p>
<p><b>Eligibility</b></p>	<p><b>Q: Who is eligible/who can benefit from the support tool?</b></p> <p>A: It should be noted that M-ERA NET has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 685451.</p> <p><b>Q: Brief description of the process to access the tool/participate.</b></p> <p>A: N/A</p> <p><b>Q: Are there any specific restrictions to benefit from the support tool?</b></p> <p>A: N/A</p> <p><b>Q: in case of financial support, what degree of funding can be expected?</b></p> <p>A: Funding is received from Horizon 2020.</p>
<p><b>Cooperation (cross-regional, cross-border, cross initiatives)</b></p>	<p><b>Q: Does the support tool/mechanism cooperate with other mechanisms/entities?</b></p> <p>A: Yes</p> <p><b>Q: Specify which ones and how this cooperation materializes.</b></p> <p>A: M-ERA.NET 2 cooperates systematically with the European RTD community in materials research and innovation including materials for energy.</p>
	<p><b>Q: What are the perceived advantages of the tool? (via reporting or interviews)</b></p>

<b>Qualitative assessment of the tool/mechanism</b>	A: N/A <b>Q: What are the perceived disadvantages or shortcomings of the tool?</b> A: N/A
	<b>Q: Is there room for improvement? Please specify on which aspects and to what extent. (via interviews)</b> A: N/A
	<b>Q: Examples of success of the tool (via interviews).</b> A: Please read about the many success stories posted here: <a href="https://www.m-era.net/success-stories">https://www.m-era.net/success-stories</a>

**IX.4.9. HORIZON 2020**

Theme	Questions/Answers
<b>Description of the tool/mechanism</b>	<p><b>Q: Objective, background</b> A: Horizon 2020 is the biggest EU Research and Innovation programme ever with nearly €80 billion of funding available over 7 years (2014 to 2020)—in addition to the private investment that this money will attract. It promises more breakthroughs, discoveries and world-firsts by taking great ideas from the lab to the market. Horizon 2020 is the financial instrument implementing the Innovation Union, a Europe 2020 flagship initiative aimed at securing Europe's global competitiveness. Seen to drive economic growth and create jobs, Horizon 2020 has the political backing of Europe's leaders and the Members of the European Parliament. They agreed that research is an investment in our future and put it at the heart of the EU's blueprint for smart, sustainable and inclusive growth and jobs.</p> <p><b>Q: Structure of the tool and resources available (HR + financial envelope for operating).</b> A: Horizon 2020 has 3 pillars:</p> <p><b>1) Excellent science:</b></p> <ul style="list-style-type: none"> <li>- European Research Council (Please see separate note about this)</li> <li>- Future and Emerging Technologies</li> <li>- Marie Curie actions</li> <li>- Research Infrastructures, including e-infrastructures</li> </ul> <p><b>2) Industrial leadership:</b></p> <ul style="list-style-type: none"> <li>- Leadership in enabling and industrial technologies</li> <li>- Access to risk finance</li> <li>- Innovation in SMEs</li> <li>- Access to Risk Finance</li> </ul> <p><b>3) Societal Challenges</b></p> <ul style="list-style-type: none"> <li>- Health, demographic change and wellbeing</li> <li>- Food security, sustainable agriculture and the bio-economy</li> <li>- Secure, clean and efficient energy</li> </ul>

	<p>- Smart, green and integrated transport                  - Climate action and resource efficiency + raw materials                  - Innovative, inclusive, reflective societies                  For a full list of projects, please click <a href="#">here</a>.  <b>Q: Origin of the initiative (public, private, non-profit, academic).</b>                  A: Public  <b>Q: Has the tool/mechanism undergone substantial changes over time? If so, please explain and include the rationale behind the change.</b>                  A: Horizon 2020 was called the Research and Innovation Funding FP7 Programme from 2007-2013.</p>
<b>Categorisation of tool/mechanism</b>	<p><b>Q: How does your structure support substitution (financial/non-financial support)? Specify what non-financial support is available (e.g., information-sharing, training, networking).</b>                  A: Financial  <b>Q: What is the geographical scope of the tool/mechanism?</b>                  A: Europe  <b>Q: Which industry sectors are targeted?</b>                  A: Science, research &amp; Innovation projects in the various industry sectors</p>
<b>Eligibility</b>	<p><b>Q: Who is eligible/who can benefit from the support tool?</b>                  A: researchers, scientists, companies  <b>Q: Brief description of the process to access the tool/participate</b>                  A: First, a proposal must be submitted. The Participant. Many calls require a team of at least 3 partners. There is also a partner search option. Once the deadline has passed, all proposals are evaluated by a panel of independent specialists in their fields. The panel checks each proposal against a list of criteria to see if it should receive funding. Once a proposal passes the evaluation stage (five months duration), applicants are informed about the outcome. The European Commission then executes a grant agreement with each participant. The grant agreement confirms what research &amp; innovation activities will be performed, the project duration, budget, rates and costs, the European Commission's contribution, all rights and obligations, and more. The time limit for signing the grant agreements is generally three months.                  To participate to Horizon 2020 projects, the easiest access is via the national contact points: <a href="https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/support/ncp">https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/support/ncp</a></p>

**IX.4.10. EUROSTARS**

Theme	Questions/Answers
<b>Description of the tool/mechanism</b>	<p><b>Q: Objective, background.</b>                  A: Eurostar is a funding program for R&amp;D businesses. It helps entrepreneurs commercialize innovative projects. A project is always led</p>

	<p>by an SME, includes 3-4 participants from 2-3 countries, and lasts 2-3 years. More than on quarter of proposals receives funding.</p> <p>Eurostars is the only European funding programme dedicated specifically to support SMEs that conduct innovative R&amp;D- projects. With its bottom-up approach, it stimulates international collaborative research and innovation projects that will be commercialised rapidly. A Eurostars project must have a civilian purpose and be aimed at the development of a new product, process or service.</p> <p><b>Q: Structure of the tool and means available (HR + financial envelope for operating).</b> A: N/A</p> <p><b>Q: Origin of the initiative (public, private, non-profit, academic).</b> A: Public</p>
<p><b>Categorisation of tool/mechanism</b></p>	<p><b>Q: How does your structure support substitution (financial/non-financial support)? Specify what non-financial support is available (information-sharing, training, networking).</b> A: Financial</p> <p><b>Q: What is the geographical scope of the tool/mechanism?</b> A: Europe</p> <p><b>Q: Which industry sectors are targeted?</b> A: R&amp;D Industries</p>
<p><b>Eligibility</b></p>	<p><b>Q: Who is eligible/who can benefit from the support tool?</b> A: The criteria are the following:</p> <ul style="list-style-type: none"> <li>• Must be an SME performing R&amp;D</li> <li>• Planning to develop an innovative new product, process or service</li> <li>• Desire to gain access to new markets</li> <li>• Desire to cooperate internationally</li> <li>• Desire for the product to be rapidly commercialised</li> </ul> <p><b>Q: Brief description of the process to access the tool/participate.</b> A: The first step is the application phase, and the applicant should contact their national project coordinator, who will guide them through the process. Afterwards, the applicant must create a Eurostar’s account which is required to upload the necessary annexes the submission. The second step is the evaluation of the application, which is managed by the EUREKA Secretariat (ESE). The evaluation phase covers the period from the submission deadline to the dispatch of letters confirming which projects will receive public support. Within 4 months of the submission deadline, the EUREKA Secretariat announces the list of projects that have been earmarked for funding. Projects approved for funding earn the right to be officially recognised as a Eurostars project. Only the very best applications will successfully navigate the various stages and receive public support. Finally, Eurostars projects are monitored at national and European level.</p> <p>At European level, the monitoring of the projects is done by the EUREKA Secretariat. The main participant of each Eurostars project is required to</p>

	<p>report (in English) on the progress of the project during its life cycle. This reporting will be supported by three different documents sent by the EUREKA Secretariat:</p> <ul style="list-style-type: none"> <li>• Project progress report (PPR),</li> <li>• Final Report (FiR), and</li> <li>• Market Impact Report (MIR).</li> </ul> <p>The purpose of reporting is to allow the EUREKA Secretariat to actively monitor and follow-up active Eurostars projects. The reports provide all necessary information about project status.</p> <p><b>Q: Are their specific restrictions to benefit from the support tool?</b> A: None besides those mentioned above in the eligibility criteria.</p> <p><b>Q: In case of financial support, what degree of funding can be expected?</b> A: Eurostars is backed by €861 million of national funding from its countries. It is further supported by €287 million of EU funds, for a total of €1.14 billion. Eurostars applies a decentralised funding procedure; participants do not receive funding directly from the EUREKA Secretariat or the EU. All funding to participants in approved projects is managed by their respective funding body according to their national funding rules and procedures.</p>
<p><b>Cooperation (cross-regional, cross-border, cross initiatives)</b></p>	<p><b>Q: Does the support tool/mechanism cooperate with other mechanisms/entities?</b> A: Yes</p> <p><b>Q: Specify which ones and how this cooperation materializes.</b> A: Works with the National offices of countries, and falls under the Horizon 2020 Framework Programme</p>
<p><b>Qualitative assessment of the tool/mechanism</b></p>	<p><b>Q: What are the perceived advantages of the tool? (via reporting or interviews)</b> A: N/A</p> <p><b>Q: What are the perceived disadvantages or shortcomings of the tool?</b> A: N/A</p> <p><b>Q: Is there room for improvement? Please specify on which aspects and to what extent? (via interviews)</b> A: N/A</p> <p><b>Q: Examples of the success of the tool (via interviews).</b> A: There are many success stories to be found here: <a href="https://www.eurostars-eureka.eu/eurostars-success-stories">https://www.eurostars-eureka.eu/eurostars-success-stories</a></p>

## X. Appendix: other initiatives abroad

The Swedish substitution centre inspires by the Danish website initiative to help SMEs build knowledge and substitute dangerous substances to facilitate a circular economy. This project is financed by the Danish Environmental Protection Agency.

<http://www.kemiikredsloeb.com/>

The Danish agency for environment has inventoried strategies for 40 groups of priority substances that shall/should be substituted.

<https://mst.dk/kemi/kemikalier/fokus-paa-saerlige-stoffer/listen-over-uoenskede-stoffer/>

In Denmark and Sweden, taxations schemes directed at products containing hazardous substances are used as an incentive to substitute.

- The tax on phthalates in Denmark was removed in 2019 due to a reduction of phthalates in products because of regulation. Its authorizing language follows:

“Pursuant to the Danish PVC Tax Act (Act no. 253 of 19 March 2007) certain goods are subject to taxation when they contain phthalates. This Act requires Danish companies that manufacture goods which are covered by the scope of the Act and companies that receive such goods from abroad, to pay a tax. The tax on phthalates is based on the weight of the phthalates in the goods. The Act covers many goods categories, including flooring material, cables, ring binders, gloves, etc.”

- Flame retardants in Sweden: <https://chemicalwatch.com/60745/>

According to an analysis by KPMG, “The chemical tax was effective 1 July 2017, and it applies to two categories of products that contain flame retardants: (1) “white goods” and (2) other electrical goods (such as computers, tablets, televisions, phones, games consoles and routers). The chemical tax is due from any business that manufactures the subject goods in Sweden or brings “in-scope” goods into Sweden from either the EU or from outside the EU by import. There is an option to register as a “warehouse” that may shift the responsibility for the chemical tax to a party further down the supply chain. Also, there may be an opportunity to reduce the amount of the chemical tax when an in-scope product contains low levels of the potentially dangerous chemicals. In such instances, two deductions are available: 50% or 90%. The deduction percentage depends on the proportion of certain bromine, chlorine, and phosphorous compounds that are included within any circuit boards or plastic parts that are a part of an in-scope product.”

No efficiency assessment of this taxation scheme was found.

Spanish trade unions have encouraged substitution by informing workers on their exposure risks if they are working with hazardous substances). This has led to requests for employers to understand and reduce the exposure risks through risk management measures rather than through substitution. Unions acted as intermediates.

## XI. Appendix : Overview of data sources

### XI.1. Existing data sources

#### XI.1.1. SIN LIST

SIN list	
<b>Reference / Access</b>	<a href="https://chemsec.org/sin-list/">https://chemsec.org/sin-list/</a> The full database (chemical information) can be downloaded directly via the website. Alternatively, Chemsec could export it. The Producer list is not downloadable.
<b>Producer</b>	Chemsec, Swedish NGO
<b>Description</b>	The ChemSec SIN list is a list of substances that meet the criteria to be listed as SVHC, although they have not (yet) been listed as SVHC. The SIN list has been elaborated based on ECHA database.
<b>Available data against prioritization criteria</b>	Hazard classes SIN groups - chemical functional groups -- searchable format Substance uses (list of) <ul style="list-style-type: none"> <li>• possible uses (qualitative, not in a searchable format)</li> <li>• technical functions (qualitative, not in a searchable format)</li> <li>• sector end use (SU) - searchable format</li> <li>• chemical product category (PC) - searchable format</li> <li>• article category (AC) - searchable format</li> <li>• process categories (PROC)]- searchable format</li> <li>• environmental release category (ERC) – not in a searchable format</li> </ul> Regulatory status – searchable format Alternatives (list of alternatives gathered in the marketplace tool, non-exhaustive) – see Marketplace Producers (company names and countries) Production volumes (classes of production volumes) - searchable format <ul style="list-style-type: none"> <li>• 0-10 t/y</li> <li>• 10-100t/y</li> <li>• 100-1 000 t/y</li> <li>• 1 000-10 000 t/y</li> <li>• 10 000-100 000 t/y</li> <li>• 100 000-1 000 000 t/y</li> <li>• 1 000 000-10 000 000 t/y</li> </ul>

	Substances found in the environment – “Biomonitoring data”- qualitative, not in a searchable format
<b>Reliability</b>	Very good. The database is very reliable. It compiles publicly available information from ECHA and other official sources, which are quoted.
<b>Completeness</b>	Very good. 919 substances are covered to date (March 2019). Production volume is available only if the substance has been registered, if tonnage data are not confidential and if the chemical is not used only as an intermediate. Substance volumes produced per country are not available. In general, there is no consolidated information on substance volumes produced per country or per company. Chemsec had a court case several years ago to force publication of more detailed information, but it lost the case. When an authorization has been granted to a company to use SVHC, more detailed information is available on ECHA’s website. However, this represents only a small part of substances of concern.
<b>Coherence</b>	Medium. Producer information is not available for all substances.
<b>Quantitative indicators</b>	Good – production volumes Some substances have multiple production volume classes (depending on their use), but the uses associated with each class are not specified.
<b>Automation / Searchable format</b>	Very good
<b>Information specific to Belgium</b>	Low. Producer information includes location.
<b>Strengths</b>	The SIN list is more complete than the list of SVHC Open access Searchable format Completeness and reliability Updated
<b>Weaknesses</b>	No information on Belgian volumes, and information on substance producers is not searchable. Further prioritisation needs to be conducted.
<b>Perspectives</b>	Updates. However, there is discussion about whether new substances should be added to the SIN list. As it is a prioritization tool, there is concern that introducing more substances would disperse innovation resources.

	<p>The SIN group classification is not yet available in Excel file format, but the classification is available upon request. The SIN List is divided into the following groups:</p> <ul style="list-style-type: none"><li>• Alkylphenols</li><li>• Amino carbonyl compounds</li><li>• Antimony compounds</li><li>• Aromatic amines</li><li>• Arsenic compounds</li><li>• Azo compounds</li><li>• Beryllium compounds</li><li>• Bisphenols</li><li>• Boron compounds</li><li>• Cadmium compounds</li><li>• Chromium compounds</li><li>• Cobalt compounds</li><li>• Electrophiles</li><li>• Glycol ethers</li><li>• Hydrazines</li><li>• Lead compounds</li><li>• Mercury compounds</li><li>• Mineral fibres</li><li>• Nickel compounds</li><li>• Nitro compounds</li><li>• Nitrosamines</li><li>• Organotin compounds</li><li>• Parabens</li><li>• Perfluorinated compounds</li><li>• Petroleum</li><li>• Phthalates</li><li>• Polyaromatics</li><li>• Polyhalogenated aromatics</li><li>• Polyhalogenated alkanes</li><li>• Polyhalogenated alkenes</li><li>• Thioamino carbonyl compounds</li></ul>
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## XI.1.2. MARKETPLACE

Marketplace	
<b>Reference / Access</b>	<a href="https://marketplace.chemsec.org/">https://marketplace.chemsec.org/</a> Chemsec can export the Marketplace database upon request.
<b>Producer</b>	Chemsec, Swedish NGO
<b>Description</b>	Marketplace is a platform for the producers of alternatives to advertise their solution (sales pitch and contact details).
<b>Available data against prioritization criteria</b>	Substance alternatives, which are classified by: <ul style="list-style-type: none"> <li>• Technical functions (not directly coherent with technical functions in SIN list) - searchable format</li> <li>• Sector end use (SU) - searchable format</li> <li>• Material article category (AC) - searchable format</li> <li>• Legal requirements, standards and third-party labels</li> </ul>
<b>Reliability</b>	Medium. Information is not verified by Chemsec. Substance producers are responsible for choosing the technical functions and sectors. Substance users are responsible for verifying that the substance is suitable for their use. NB: Chemsec does not have information about whether sales were made based on these ads.
<b>Completeness</b>	Medium No guarantee of completeness, and the introduction of alternatives is voluntary
<b>Coherence</b>	Very good Classification of alternatives is made coherent The description always follows the same structure: summary, description, practical implementation, substances it can potentially replace.
<b>Quantitative indicators</b>	No
<b>Automation / Searchable format</b>	Very good
<b>Information specific to Belgium</b>	Bad overall. Information is available on the identity of the supplier, and this can help find Belgian alternative producers
<b>Strengths</b>	Open access Searchable format Updated Finding alternatives in other ways has been reported as very time consuming by FPS Health.
<b>Weaknesses</b>	No verification

	Information is presented as a marketing pitch and not as objective information. No information on the technical and economic feasibility of substitution.
<b>Perspectives</b>	The tool will be improved by adding more ads and making them more user friendly and ranking them (criteria to be defined).

### XI.1.3. SINMILIARITY

SINmilarity	
<b>Reference / Access</b>	<a href="http://sinimilarity.chemsec.org/">http://sinimilarity.chemsec.org/</a>
<b>Producer</b>	Chemsec, Swedish NGO
<b>Description</b>	SINmilarity is a tool designed for the non-chemist to learn about regrettable substitution. Based on a CAS number, name or structure, a user can search whether a given substance is like a substance on the SIN list based on structural similarity, and on the existence of specific structural elements of importance to toxicity. In case a substance is similar, there is a chance that the substance will be later recognized as an SVHC, therefore this tool should be used with caution.
<b>Available data against prioritization criteria</b>	No relation with prioritization criteria. Available data is related to the structural resemblance with substances on the SIN list/ Matching SIN groups.
<b>Reliability</b>	Good – it provides information on a potential toxicity hotspot based on resemblance but does not give a final answer on toxicity.
<b>Completeness</b>	Very good
<b>Coherence</b>	Very good
<b>Quantitative indicators</b>	Not relevant for prioritisation A percentage of resemblance is provided.
<b>Automation / Searchable format</b>	Good – Answer is automatic once the substance is searched but answers are not directly exportable for all substances.
<b>Information specific to Belgium</b>	None
<b>Strengths</b>	Can be used to screen the hazards of potential alternatives.
<b>Weaknesses</b>	Can only be used if the substance is known. Therefore, this is of little value as a first-cut prioritization of substances / group of substances that need public action.
<b>Perspectives</b>	-

## XI.1.4. QSAR TOOLBOX

QSAR Toolbox	
<b>Reference / Access</b>	<a href="https://qsartoolbox.org/">https://qsartoolbox.org/</a> Designed for expert users (contrary to SINmilarity tool)
<b>Producer</b>	OECD, ECHA, Oasis LMC
<b>Description</b>	The QSAR Toolbox is a free software application that supports reproducible and transparent chemical hazard assessment. It offers functionalities for retrieving experimental data, simulating metabolism and profiling properties of chemicals. These information and tools can be used to find structurally and mechanistically defined analogues and chemical categories.
<b>Available data against prioritization criteria</b>	No relation with prioritization criteria Simulation of hazard properties
<b>Reliability</b>	Good – it provides an information on a potential toxicity hotspot based on structural similarity but does not give a final answer on toxicity.
<b>Completeness</b>	Very good
<b>Coherence</b>	Very good
<b>Quantitative indicators</b>	Not relevant for prioritisation
<b>Automation / Searchable format</b>	Good – Answer is automatic once the substance is searched but answers are not directly exportable for all substances.
<b>Information specific to Belgium</b>	None
<b>Strengths</b>	Can be used to screen the hazards of potential alternatives.
<b>Weaknesses</b>	Can only be used if the substance is known. Therefore, this is of little use for a first-cut prioritization of substances / group of substances that need public action.
<b>Perspectives</b>	Good – it provides information on a potential toxicity hotspot

## XI.1.5. SIN PRODUCERS

SIN Producers	
<b>Reference / Access</b>	<a href="https://sinproducers.chemsec.org/">https://sinproducers.chemsec.org/</a> Exportable in Excel
<b>Producer</b>	Chemsec, Swedish NGO
<b>Description</b>	The SIN Producers List is the only searchable database of companies that are producing or importing the most hazardous chemicals in Europe and USA. This information can be used for making sustainable investments, identifying companies with a product portfolio likely to be regulated and for comparing chemical companies against each other.
<b>Available data against prioritization criteria</b>	<ul style="list-style-type: none"> <li>• Substance producers</li> <li>• Regulatory status (authorisation or candidate list)</li> </ul>
<b>Reliability</b>	Good - probably a gap between registration and real production (more countries named than where production occurs, see more information in REACH IT)
<b>Completeness</b>	Good – based on available data via regulatory processes
<b>Coherence</b>	Very good
<b>Quantitative indicators</b>	Yes – number of substances on the SIN list
<b>Automation / Searchable format</b>	Very good
<b>Information specific to Belgium</b>	Good The list of Belgian producers of substances on the SIN list can be exported. This relies on country production / registration information provided by ECHA. Some substances can be registered for more countries than produce them.
<b>Strengths</b>	Geographical information Searchable format Direct link with the SIN list tool for more information on the substance Direct link with the Chemsec Marketplace tool to identify alternatives
<b>Weaknesses</b>	No information on final users Only substances that have been registered are provided
<b>Perspectives</b>	-

## XI.1.6. SUBSPORT

Subsport	
<b>Reference / Access</b>	<a href="http://www.subsportplus.eu/">http://www.subsportplus.eu/</a>
<b>Producer</b>	LIFE, DBU, BAUA, Lebensministerium
<b>Description</b>	Subsport was a European project aiming at helping companies with substitution. Most alternatives mentioned on Subsport can also be found on the Marketplace (big overlap).
<b>Available data against prioritization criteria</b>	<ul style="list-style-type: none"> <li>• Alternatives: Companies wrote about their experience of using alternatives for 9 different substances of concern.</li> <li>• Compilation of list of priority substances</li> </ul>
<b>Reliability</b>	Good Project partners assessed alternatives.
<b>Completeness</b>	Medium – not updated
<b>Coherence</b>	Good
<b>Quantitative indicators</b>	Low
<b>Automation / Searchable format</b>	Medium Only searchable list of priority substances
<b>Information specific to Belgium</b>	No
<b>Strengths</b>	Information on alternatives Searchable format
<b>Weaknesses</b>	Not updated Less user friendly compared with Marketplace.
<b>Perspectives</b>	The project closed in 2017.

## XI.1.7. PUBLIC ECHA PORTAL AND PUBLIC DOSSIERS

ECHA information portal on chemicals	
<b>Reference / Access</b>	<a href="https://echa.europa.eu/information-on-chemicals">https://echa.europa.eu/information-on-chemicals</a>
<b>Producer</b>	ECHA based on data provided by the industry and Member States
<b>Description</b>	<p>The information portal on chemicals include a searchable section where a user can search a CAS number or a substance name and find publicly available information on chemicals.</p> <p>This information is approximately the same as the information provided by ChemSec, except that it includes a broader list of substances (not only those showing SVHC properties) and is not available in an easy searchable format (written paragraphs).</p>
<b>Available data against prioritization criteria</b>	<ul style="list-style-type: none"> <li>• Hazard classes</li> <li>• Hazard magnitude / scientific properties</li> <li>• Volume classes</li> </ul> <p>Public information only provides ranges for one year. Therefore, we can only access to the aggregated volume for all companies that have registered and filter out Belgian registrants. However, if multiple companies have registered, among which there is a Belgian company, there is no way to know the proportion of volume that is produced in Belgium.</p> <ul style="list-style-type: none"> <li>• Substance use</li> <li>• Active registrants / suppliers (that have registered the substance)</li> </ul> <p>More information is available in dossiers, but it is not in a searchable format:</p> <ul style="list-style-type: none"> <li>• Information regarding the efforts of users to substitute annexe XIV substances is public and resides in authorisation dossier, except for confidential information. Therefore, information is sometimes generic, especially when a consortium has filed a dossier).</li> <li>• AOA in restriction dossiers or RMOA dossiers are publicly available.</li> </ul>
<b>Reliability</b>	<p>Good</p> <p>Reported uses may be subject to errors or false declarations (to cover more uses than what the substance does in reality).</p>
<b>Completeness</b>	<p>Good</p> <p>Hazard/risk data are sometimes missing for some end points.</p> <p>The information on hazards for the environment is usually incomplete in safety data sheets. A lot of information is missing or has limited reliability in the environmental impact assessment because it is missing in the registration dossier or not well developed.</p>
<b>Coherence</b>	Very good

<b>Quantitative indicators</b>	Low
<b>Automation / Searchable format</b>	<p>Medium</p> <p>Advanced research is possible by filtering out, notably:</p> <ul style="list-style-type: none"> <li>• Hazard properties of relevance for prioritisation, such as CMR,PBT, and vPvB</li> <li>• Place in the life cycle:                             <ul style="list-style-type: none"> <li>▪ Consumer uses</li> <li>▪ Article service life</li> <li>▪ Widespread uses by professional workers</li> <li>▪ Formulation or re-packing</li> <li>▪ Uses at industrial sites</li> <li>▪ Manufacture</li> </ul> </li> <li>• Product category (PC)</li> <li>• Sector of use (SU)</li> <li>• Process category (PROC)</li> <li>• Environmental release category (ERC)</li> <li>• Article category (AC)</li> </ul>
<b>Information specific to Belgium</b>	<p>Low</p> <p>Information is accessible on substance registrants only, and not in a searchable format (accessible once the substance has been identified).</p>
<b>Strengths</b>	The most up-to-date and complete public information that is available, compiled in a database
<b>Weaknesses</b>	<p>More substances than SVHC</p> <p>Information on environmental toxicity is partial / missing</p> <p>Less user friendly than the Chemsec tool- cannot be filtered</p>
<b>Perspectives</b>	<p>Information on environmental toxicity should be improved. Tools such as the QSAR Toolbox that provide information on environmental toxicity will be further promoted to industry in order to see an improvement in registration dossiers.</p> <p>To further support industry in their substitution work, in 2019 , ECHA plans to:</p> <ul style="list-style-type: none"> <li>• publish a new, "easy-to-digest" shortlist of safer alternatives to hazardous substances compiled from REACH authorisation applications.</li> <li>• display on ECHA's website information on the analysis of alternatives from the dossiers as well as the key information on alternatives obtained during public consultation in a searchable format.</li> </ul>

## XI.1.8. REACH IT

Reach IT	
<b>Reference / Access</b>	Access to REACH IT is possible by accredited persons of FPS Health and FPS Economy, in a specific room.
<b>Producer</b>	ECHA based on data provided by the industry and Member States
<b>Description</b>	<p>Data available in REACH IT is based on registration, restriction and authorisation dossiers. It is the most complete and specific database that can be found on chemical substances in Europe, besides specific targeted research.</p> <p>Registration dossiers in REACH IT provide information on production volumes per company and per year, but not per use nor per country. The company's main country is mentioned but production can originate from multiple countries. Information on countries can only be found manually.</p> <p>Some information in registration and authorisation dossiers is confidential; whereas information from restriction dossiers is publicly available.</p>
<b>Available data against prioritization criteria</b>	<ul style="list-style-type: none"> <li>• All production processes are presented in the confidential dossier (REACH IT) in more detail, when it is not subject to intellectual property.</li> <li>• Volume per use (not systematic): Information on volume per use is available in registration dossiers when substances pose risk.</li> <li>• Risk characterization ratio: REACH IT (confidential)</li> <li>• Risk management measures: REACH IT (confidential)</li> <li>• AoAs in authorisation dossiers are not publicly available and are only accessible in details to the person in charge of the dossier at SEAC. Options are discussed at SEAC meetings, therefore members of SEAC are aware of the main aspects.</li> <li>• Information on use sectors is available in authorisation dossiers in the Chemical Safety Reports (available via the confidential REACH IT report).</li> </ul>
<b>Reliability</b>	<p>Good</p> <p>Declared uses may be subject to errors or false declarations (to cover more uses than what the substance does in reality).</p>
<b>Completeness</b>	Good
<b>Coherence</b>	Very good
<b>Quantitative indicators</b>	Low
<b>Automation / Searchable format</b>	Low
<b>Information specific to Belgium</b>	<p>Medium</p> <p>Some information about registered volume per producer is available.</p>

<b>Strengths</b>	Accessible to all members of the REACH national committee subject to a confidentiality agreement.
<b>Weaknesses</b>	Information in authorisation and registration dossiers cannot be made public. Confidentiality must be clearly respected when publishing priorities.
<b>Perspectives</b>	Split of declared volumes between uses is more and more common in new registration dossiers. Thus, this information is likely to be more easily accessed via REACH IT in the future.

#### XI.1.9. EUROPEAN POLLUTANT RELEASE AND TRANSFER REGISTER

<b>Reference / Access</b>	<a href="http://prtr.ec.europa.eu/#/home">http://prtr.ec.europa.eu/#/home</a> <a href="https://www.eea.europa.eu/data-and-maps/data/member-states-reporting-art-7-under-the-european-pollutant-release-and-transfer-register-e-prtr-regulation-19">https://www.eea.europa.eu/data-and-maps/data/member-states-reporting-art-7-under-the-european-pollutant-release-and-transfer-register-e-prtr-regulation-19</a>
<b>Producer</b>	Facilities, compiled by competent authorities
<b>Description</b>	<p>The European Pollutant Release and Transfer Register may be relevant to identify substances released by industrial sites that are found in the environment.</p> <p>A facility must report data under E-PRTR if it meets the following criteria:</p> <ul style="list-style-type: none"> <li>• the facility falls under at least one of the 65 E-PRTR economic activities listed in Annex I of the E-PRTR Regulation, and it exceeds at least one of the E-PRTR capacity thresholds</li> <li>• the facility transfers waste off-site in quantities which exceed specific thresholds set out in Article 5 of the Regulation.</li> <li>• The facility releases pollutants which exceed specific thresholds specified for each media - air, water and land - in Annex II of the E-PRTR Regulation.</li> </ul> <p>This database does not include substances released by articles during their service life and end-of-life.</p>
<b>Available data against prioritization criteria</b>	<p>Substances found in the environment + tonnages</p> <p>There is only partial overlap between SVHC, and the substances reported by this system.</p>
<b>Reliability</b>	Good
<b>Completeness</b>	Low
<b>Coherence</b>	<p>Medium</p> <p>Some information can be reported voluntarily by industrial facilities.</p>
<b>Quantitative indicators</b>	Very good

<b>Automation Searchable format</b> /	Very good
<b>Information specific to Belgium</b>	Good (provincial or facility level if not confidential)
<b>Strengths</b>	Public data Searchable format and quantitative data
<b>Weaknesses</b>	Not exportable in bulk using <a href="http://prtr.ec.europa.eu/#/home">http://prtr.ec.europa.eu/#/home</a> but exportable using links provided by EEA. Many substances are not SVHCs.
<b>Perspectives</b>	-

<https://emars.jrc.ec.europa.eu> can be used to cases of accidental leakage to the environment, which appears less relevant in the context of substitution.

#### XI.1.10. FLEMISH ENVIRONMENTAL PERMITS

<b>Reference / Access</b>	Permitting requests can be accessed by permitting officers Permits are publicly available upon request.
<b>Producer</b>	Department Omgeving
<b>Description</b>	Information on substance volumes used is available in environmental permits.
<b>Available data against prioritization criteria</b>	<ul style="list-style-type: none"> <li>• Substance volumes</li> <li>• Substance hazards (CLP classification)</li> </ul> Sectors: no specific information but can be found. No specific information on alternatives.
<b>Reliability</b>	Very good (information is verified during inspections)
<b>Completeness</b>	Medium Substance use in articles is not reported
<b>Coherence</b>	Good Provincial level
<b>Quantitative indicators</b>	Low Difficult to compile
<b>Automation Searchable format</b> /	Bad No digitalisation yet. It is an ongoing project. This information takes time to compile. Information is dispersed at provincial level in Flanders. For instance, Flanders finds it difficult to respond to

	European calls for information in a timely fashion because of the short deadlines imposed
<b>Information specific to Belgium</b>	Very good
<b>Strengths</b>	Reliable and specific information
<b>Weaknesses</b>	Time-consuming to compile
<b>Perspectives</b>	<p>Information collected during permit instruction and inspections may be shared with other administrations under certain conditions. It is currently already partially being done via the REACH forum (inspections).</p> <p>The permit digitalization project is now mandatory, but implementation is still ongoing, and permits cannot yet be accessed online.</p>

#### XI.1.11. WALLON SECURIWAL PLATFORM AND ENVIRONMENTAL PERMITS

Securiwal	
<b>Reference / Access</b>	<p><a href="http://environnement.wallonie.be/Seveso/securiwal">http://environnement.wallonie.be/Seveso/securiwal</a></p> <p>Permits are publicly available (upon request). Information on substance function that results from confidential process conditions could be shared with the administration if it is useful. Some of this data is already shared with FPS Employment regarding Seveso competencies. There is no known reluctance by industry regarding data safety related to Securiwal or permit digitalisation.</p>
<b>Producer</b>	<p>SEVESO facilities</p> <p>SPW DGO3</p>
<b>Description</b>	<p>Securiwal is a web application developed by the PSW to follow-up on hazardous substances used by Seveso sites. It has been active since 2016.</p> <p>Industrials also have access to Securiwal. They can check anonymously whether they are likely to be Seveso-classified based on the list and quantities of substances used. Seveso sites have a login and password and must inventory their hazardous substances on Securiwal. There are approximately 100 Seveso sites in Wallonia.</p>
<b>Available data against prioritization criteria</b>	<ul style="list-style-type: none"> <li>• Substance identification (CAS number)</li> <li>• Substance and mixtures volumes stored and processed</li> <li>• Substance and mixture hazards: only risk and hazard classification are included in securiwal, but companies are encouraged to add SDS. The service references a BIG database, a database of MSDS gathered, verified and selected by a Flemish firemen's association. It includes SDS for mixtures at different concentrations.</li> </ul>

	<ul style="list-style-type: none"> <li>Company identification number – can be related to the sector of activity</li> </ul> <p>No information is stored automatically regarding the function fulfilled by a substance. However, this information can be derived from the expertise of the audit team based on audits and on security reports that are part of Seveso dossiers (process description, this information is confidential).</p> <p>No information on alternatives.</p>
<b>Reliability</b>	<p>Very good</p> <p>Information is verified during audits.</p> <p>There is a process ongoing to certify the authenticity of Securiwal data.</p>
<b>Completeness</b>	<p>Medium</p> <p>For non-SEVESO sites, the information on hazardous substances is entered by the official in charge of dossier follow-up. It is systematic for new permits but has not been applied to former permits.</p> <p>Approximately 150 non-Seveso sites are entered in the system.</p> <p>The scope of substances in the system is broader than the SVHC list.</p> <p>Hazardous substances implemented in Securiwal are those that are taken into account in the Seveso regulation, which includes hazardous substances for human health (acute, chronic 1...), which represent a physical danger (flammable, explosives ...), which are of concern for the environment, which can react violently with water, which emit hazardous gas, etc. The classification of hazard in Securiwal (as well as in Seveso) is based on the harmonized classification of the CLP Regulation. Additional hazardous substances and mixtures that have no harmonised classification in CLP are also implemented manually within the system by officials based on external databases (e.g., Flemish firemen's database). However, not all hazardous substances are included in the system. Hazard criteria used to classify substances as SVHC are also found in the system.</p>
<b>Coherence</b>	<p>Good - some information is included voluntarily</p>
<b>Quantitative indicators</b>	<p>Low</p>
<b>Automation / Searchable format</b>	<p>Low</p>
<b>Information specific to Belgium</b>	<p>Information is available by company and can be related to the geographical information of each company.</p> <p>With the current version of the tool, it is not possible to export tonnages used/stored per substance /hazard group.</p> <p>For now, it is only possible to make queries regarding the companies that uses substances by 1) substance name, 2) Seveso category, 3) hazard category (for instance, acute tox 1). Then one needs to click company-by-company to identify the volumes. Therefore, information is present, but is not easily extracted.</p>

<b>Strengths</b>	<p>Digitalisation Extensive information</p>
<b>Weaknesses</b>	<p>The web tool is not common to other regions. It had been envisaged initially to create a common tool but was too complicated because of public tendering rules. Flanders had a service contract for IT development and could not contract with other actors.</p> <p>No automatic export functions useful for prioritisation</p>
<b>Perspectives</b>	<p>Coupling Securiwal with SIG is a move in that direction, in order to be able to easily identify potential responsible installations whenever a pollution is detected in the environment.</p> <p>Implementation of historical permit data in Securiwal. Entering data from former permits on the hazardous substances in Securiwal would require a huge level of effort since permits last 20 years. It would take between half an hour (adding details regarding the company) and a day (company details plus long list of substances) per site depending on the complexity of the site. Philippe Raucq estimates it would require 2/3 FTE for 2 years, if all sizes of facilities are included (from large sites to coachbuilders). Some time could be gained if only priority facilities are targeted.</p> <p>DGO3, the Directorate in charge of permits, has a project of digital environmental permit (for new permits only). This would enable easier data collection and avoid manual data entry. The digital permit should not be in place before 2020/2021.</p> <p>Development of new queries and export functions (e.g., to facilitate export compilation by substance or hazard classes) could be envisaged if this information is useful</p> <p>CAS numbers can be used to connect with other databases.</p> <p>Company identification number (can be found on Carrefour Bank of Enterprises) – can be related to the sector of activity.</p> <p>Remark: For safety reasons, there should be is a limit on the use information and location of hazardous substances that the administration should make available to the public (avoid having facilities targeted).</p>

Remark: To establish substance emission limit values, DGO3 use the GESTIS database (German industrial worker association). <http://limitvalue.ifa.dguv.de/>

### XI.1.12. BRUSSELS – HAZARDOUS PRODUCT INVENTORY AND ENVIRONMENTAL PERMITS

Brussels – hazardous product inventory and environmental permits	
<b>Reference / Access</b>	<p>Accessible by the administration in Brussels</p> <p>Hazardous product inventory is confidential. This information may be shared with other administrations.</p>
<b>Producer</b>	Companies and public authorities
<b>Description</b>	<p>The hazardous product inventory focuses on products (as substances or mixtures).</p> <p>In the beginning, having companies fill in substance names was considered but it was judged too big an administrative burden for companies. Companies must fill in product volumes (based on commercial names).</p>
<b>Available data against prioritization criteria</b>	<ul style="list-style-type: none"> <li>SVHC volumes: Very partial SVHC volumes used at the regional level could be established based on the inventory of hazardous products, but this would require a significant amount of work to map product data (commercial names), CAS number (substance name), and the list of SVHC. No database to link commercial names and substances (ingredients) is known to Brussels Environment. Normally, composition with CAS numbers is available on labels. However, it should be possible to easily export information on annex XIV substance volumes because they are connected to a specific chemical depot category.</li> <li>Substance hazards: Hazard phrases and mentions used in Brussels are known in the inventory of hazardous products.</li> <li>Alternatives: No specific information is available on alternatives.</li> <li>Sectors: no specific information, but they can be deduced.</li> <li>Dispersive uses: When CMR are identified, the type of use is requested, and dispersive uses are identified in order to conduct the impact assessment. This is not compiled in a database.</li> <li>Technological function: The process is requested which gives an indication of function. However, this is not compiled in a database.</li> <li>Exposition/Risk criteria: only available for CMR for which an impact assessment is conducted. This is not compiled in a database.</li> </ul>
<b>Reliability</b>	<p>Very good</p> <p>Inventory of hazardous products is considered a robust data source since they are mandatory, and industrials risk prosecution if they do not comply with the legislation.</p>
<b>Completeness</b>	Good

	<p>Very good in terms of facilities - Several hundred of dossiers have an inventory of hazardous products (30/50% of environmental permits). Most dossiers are schools, coachbuilders, or companies handling degreasing/cleaning products.</p> <p>Medium in terms of information – information focuses on CMR hazards that contribute to classification and labelling of substances and mixtures, but it does identify substances directly and information collection is not systematic for hazards besides CMR.</p>
<b>Coherence</b>	Very good
<b>Quantitative indicators</b>	Medium
<b>Automation / Searchable format</b>	<p>Low</p> <p>The hazardous product inventory is accessible as Excel sheets by company. Permits are accessible in a database ,but the information is not digitalised (not searchable).</p>
<b>Information specific to Belgium</b>	Very good
<b>Strengths</b>	<p>Some information on key hazard (CMR)</p> <p>Hazard relates to product (mixture)</p> <p>Digitalisation ongoing</p>
<b>Weaknesses</b>	<p>No complete information of SVHC</p> <p>No identification of substance name</p> <p>Poor automation in view of prioritisation</p>
<b>Perspectives</b>	<p>SDS should be improved, especially related to risk to the environment and the PBT nature of products/substances in products. There is no regional project on the matter; this should be handled at a larger scale.</p> <p>The procedure for inventory of hazardous products is regularly improved to account for new datasets. The region could go further and look for SVHC.</p> <p>Accessibility of the hazardous product inventory based on an Excel sheet can be problematic because some companies do not have excel or the latest versions of Excel. The inventory of hazardous products will be transformed to an online tool. Its release is expected for 2020. It should be easier to compile datasets once the inventory is online.</p> <p>The permitting procedure will also be digitalised. The form for a permit request will be put online in April 2019, but the whole process will not yet be digitalised. A connection between the hazard product inventory and permit digitalisation projects will be made soon.</p>

## XI.1.13. BAT KNOWLEDGE CENTRE

BAT Knowledge centre	
Reference / Access	<a href="https://emis.vito.be/en/flemish-knowledge-centre-best-available-techniques">https://emis.vito.be/en/flemish-knowledge-centre-best-available-techniques</a>
Producer	VITO, based in consultations
Description	<p><b>In Flanders, sectorial knowledge on industrial emissions and practices is developed via the Best Available Techniques process.</b></p> <p>BAT is the cornerstone of the Flemish policy related to substance use. As a complement to the European BAT process developed by the Joint Research Centre, the Flemish administration requested that VITO develop BATs. Once included in the VLAREM regulation, Best Available Techniques and associated emission levels are made mandatory and included in permits. Additional requirements beyond BAT can be added in permits. Besides the regulatory framework, BAT are important guidance documents that should be followed voluntarily. Despite this local work, the evolutions at the European level are the main driver for new Flemish regulation and actions.</p> <p>For the development of BAT, the Flemish administration agrees yearly with VITO regarding the budget and content of the work to be conducted for the administration, as part of the so called “Referentietaken”. It is a wide negotiation for all activities of VITO (climate, BAT...). Regarding BAT, priority subjects are influenced by :</p> <ul style="list-style-type: none"> <li>• the hot topics that pop up in the Flemish environment (for instance those witnessed by OVAM on waste and the interface waste/products, by the VMM in charge of monitoring air, water and soil, the topics witnessed by colleagues involved in permitting and inspectorate, waste management)</li> <li>• substances that are known as climate change contributors</li> <li>• priorities at Belgian level (REACH committee)</li> <li>• specific political priorities (endocrine disruptors, glyphosate).</li> </ul>
Available data against prioritization criteria	Some information on substance use, volumes, exposition and alternatives per sector <sup>43</sup> but not systematic
Reliability	Very good
Completeness	Bad
Coherence	Low (for our purpose)– no systematic focus on SVHC
Quantitative indicators	Bad
Automation / Searchable format	Bad

<sup>43</sup> [https://emis.vito.be/sites/emis.vito.be/files/pages/1142/2014/BAT\\_for\\_the\\_textile\\_industry\\_full\\_version\\_0.pdf](https://emis.vito.be/sites/emis.vito.be/files/pages/1142/2014/BAT_for_the_textile_industry_full_version_0.pdf)

<b>Information specific to Belgium</b>	No information – probably to some extent
<b>Strengths</b>	Sector-specific information
<b>Weaknesses</b>	Not searchable Not complete
<b>Perspectives</b>	Without changing the focus of the BAT development process (informing the VLAREM regulation and permitting), SVHC use could be more systematically screened in new BAT development process, and a specific synthesis on this issue brought to the attention of the Belgian REACH committee. This is not yet envisaged and should be one of the conclusions of this roadmap. It is the expertise of VITO rather than the documents themselves that provide potential for prioritisation.

#### XI.1.14. USE MAPS LIBRARY

Use map library	
<b>Reference / Access</b>	<a href="https://echa.europa.eu/fr/csr-es-roadmap/use-maps/use-maps-library">https://echa.europa.eu/fr/csr-es-roadmap/use-maps/use-maps-library</a> Updates to the library are published in ECHA Weekly.
<b>Producer</b>	Trade associations, referenced by ECHA
<b>Description</b>	This library includes the use description and the input parameters for workers exposure assessment (SWEDs), for consumers exposure assessment (SCEDs) and for environmental exposure assessment (SPERCs). This information is, made available by sector organisations for their typical uses. The information aims at supporting registrants in preparing their chemical safety assessments (CSAs). Registrants will find here the use description for key typical products, as agreed at sector level, as well as the associated conditions of use. This provides a realistic basis for their chemical safety assessment.
<b>Available data against prioritization criteria</b>	<ul style="list-style-type: none"> <li>• Use description</li> <li>• Information on exposure</li> </ul>
<b>Reliability</b>	Good Voluntary initiative provided in good faith by trade associations, but no verification is conducted
<b>Completeness</b>	Medium Voluntary initiative
<b>Coherence</b>	Very good (similar template)
<b>Quantitative indicators</b>	No

<b>Automation / Searchable format</b>	Very good
<b>Information specific to Belgium</b>	None
<b>Strengths</b>	Sector-specific
<b>Weaknesses</b>	No information on substance
<b>Perspectives</b>	Important: No information is provided on substance uses in the use maps. It is only the use that is described in order to help with registration dossiers. Therefore, this information is hardly usable for a first stage prioritisation, and these maps should be envisaged to verify data and collect more information on specific uses.

#### XI.1.15. CHEMSEC TEXTILE GUIDE

Chemsec textile guide	
<b>Reference / Access</b>	<a href="https://chemsec.org/business-tool/textile-guide/">https://chemsec.org/business-tool/textile-guide/</a> <a href="https://tool.textileguide.chemsec.org/">https://tool.textileguide.chemsec.org/</a>
<b>Producer</b>	Chemsec, Swedish NGO
<b>Description</b>	This Chemical Management Guide by ChemSec is a starting point for small and medium-sized textile companies to manage the chemicals present in their processes and products.
<b>Available data against prioritization criteria</b>	<ul style="list-style-type: none"> <li>• Searchable list of hazardous substances in the textile supply chain</li> <li>• Suggestion of alternatives at each process stage</li> </ul>
<b>Reliability</b>	Very good
<b>Completeness</b>	Low (only textile sector)
<b>Coherence</b>	Very good
<b>Quantitative indicators</b>	Low
<b>Automation / Searchable format</b>	Good
<b>Information specific to Belgium</b>	None
<b>Strengths</b>	User friendly
<b>Weaknesses</b>	Only tackles the textile sector Not specific to Belgium
<b>Perspectives</b>	Chemsec would like to add mixtures into the textile guide (now only substances are mentioned, which is difficult for companies to work with).

## XI.2. Existing lists of priority substances

We have compiled a selection of list of priorities that could be assessed by experts for their relevance in the Belgian context:

- **SUMER project (France) – list of carcinogenic substances people is in contact with**  
<https://travail-emploi.gouv.fr/IMG/pdf/2013-054-2.pdf>

- **ZZS list (Netherlands) comprises 1400 chemicals**

Regarding the emissions of substances of concern there is a project to strengthen the existing ZZS database connecting E- PRTR and ZZS data. The project includes the provinces, local authorities and RIVM. This project is not envisaged as connected with the substitution policy though.

- **List of substances prioritised by ECHA for substance evaluation – available to FPS Health**

Substances prioritised by ECHA for substance evaluation by Member States provide a good source of priorities, but the ECHA list is broader than the concept of SVHC. Prioritisation is based on

- Hazard information:
  - structurally similar to known substances of concern
  - substances that are persistent and bio-accumulate: PBT, vPvBs and PBT-like structures
  - endocrine disruptors
  - CMR
  - sensitizers
- Exposure information:
  - Wide dispersive use – number of sites of use, pattern and amount of releases/exposure, number and type of reported uses and exposure scenarios, incorporated in mixtures and articles used by consumers, size of exposed population
  - Number of sites if emission due to industrial use
  - Consumer use and exposure of sensitive subpopulation such as children
  - Aggregated tonnage
- Risk information:
  - Risk characterization ratio not well below 1 for human or the environment
  - Cumulative exposure from structurally related substances with critical hazardous properties

This screening is IT-based and includes cross-checking with lists established by NGOs; it can be augmented with a manual screening by Member States. ECHA provides scoring or yes/no grades for each substance.

We understand that this list compiles substances for which registration dossiers have not yet been evaluated, therefore, newly registered substances may not yet be classified as SVHC. This list is thus likely to be composed of substances for which there is not yet maturity to feed into the present

strategy. However, we recommend that the opportunity to include specific relevant substances be considered.

### **XI.3. Other information, not compiled in data sources**

#### **Monitoring of the environment**

All regions monitor the environment and, thus, have information and expertise about substances found in the environment. There is no systematic connection with permitting and chemical safety reports. In Flanders this task is undertaken by VMM. In other regions it is undertaken by parts of the administration.

### **XI.4. Missing information**

- There is no information on the identity and location of substance users and volumes used (except for substances subject to authorisation). Information on users of SVHCs is very difficult to find, even for trade associations, as reported by Agoria and essenscia.
- There is no information about the diffusion and use of alternative substances. One could cross-check the list of alternatives with the volume indicated in their registration dossier. However, alternatives may have multiples uses, among which only a few/one implies SVHC substitution. In that case it is not possible to extract the substance use volumes that serve as a substitution alternative.
- Besides the information present in authorisation and restriction dossiers, there is no readily available information about the technical and economic feasibility of substitution or on the need for support.,.

### **XI.5. Future data sources**

#### **XI.5.1. COHERENCE OF ENVIRONMENTAL PERMITS AND DIGITALISATION**

Harmonisation of permit digitalisation software between regions is a challenge. Every region has its own rules and budgets. It is not possible for a region to pay for services that are used by other regions so the budget partition must be well thought through. Plus, several calls for tenders should be organised and it is not possible to ensure that the same service provider would be selected by all three regions.

In order to have a common framework, we see the following possibilities:

- The budget is allocated via a common structure whose budget and mission are agreed upon a cooperation agreement;
- The regions agree on common requirements for the software so that there is compatibility once results are exported.

#### **XI.5.2. ASKREACH**

<https://reach-info.ineris.fr/focus/life-ask-reach>

AskREACH is a project to develop IT solutions and a mobile application to help consumers exercise their right to know the presence of substances of very high concern in articles. The objective would be to allow consumers to scan a product's barcode and see if information is available on the presence of SVHC (or the absence of SVHC above the thresholds). If the information is not present, the application automatically generates a request to make the information sent to the notifier, who under REACH (Article 33(2)) is required to respond within 45 days. These solutions already exist in Denmark and Germany.

### **XI.5.3. TRACEABILITY TOOLS**

DG Grow has launched a benchmarking study on traceability tools. This study's goals are to assess the feasibility of establishing comprehensive tools, including software applications, to track and link information on articles. The aim is to track products at all stages of their life cycle and to make relevant parts of that information available to downstream users, workers, consumers and recyclers, with an emphasis on tracking of substances of concern throughout the supply chain. In this context, the study will assess the feasibility of linking information gathered in existing IT tools and databases and making that information available to targeted users in the least burdensome and most user-friendly way possible. The study will also study ways to protect confidential business information, and of transmitting information only according to the needs of the users. Results should be available at the end of 2019.

#### **Focus on blockchain tools**

The Blockchain is a database of recorded transactions. All stakeholders in a supply chain register each step of the manufacturing process of a product, from its production to its point of sale. Each transaction is associated with the previous one to form a chain, and each block of the chain must be verified by several parties. The advantage of a blockchain registry lies in its transparency and distributed management, making it impossible to control or modify it unilaterally; and in the speed with which the traceability of a product can be verified.

In the case of SVHCs, this may involve initially recording the substance data and requiring the different actors to add the transactions of substances, mixtures or articles containing them to the blockchain. This would make it possible to monitor its distribution in the different value chains with knowledge on volumes, concentrations, and the typology of the actors involved.

A blockchain is nothing more than a register. Therefore, its intelligent coupling with other technologies, such as NFC chips, and with other innovations, such as smart contracts (autonomous programs that automatically execute predefined conditions, registered on a blockchain), should be encouraged.

The blockchain could become handy to trace substances, especially when products later become wastes and are recycled.

No existing application of the blockchain to substance traceability was identified. The ECHA database project is very different from a blockchain as no verification is foreseen.

OVAM is conducting a study (ongoing) regarding methods to track substances in plastic materials (kunststoffen). It should include solutions like block chains. The study should be available soon.

#### XI.5.4. ECHA DATABASE ON SUBSTANCE USE IN ARTICLES

The revision of the Waste Framework Directive requested ECHA to develop a draft database to ensure that article marketers provide information to their downstream users, recyclers and consumers on the presence of substances of very high concern (SVHC) at concentrations greater than 0.1% of articles. This database should be implemented in early 2020 and be immediately applicable.

In principal, this information should allow recyclers to identify parts containing substances of very high concern on the candidate list, if they search the information in the database.

This level of information would also be essential for POPs to comply with the POPs Regulation, which are specified in its Annex V ("Where only part of a product or waste (e. g., waste equipment) contains or is contaminated with persistent organic pollutants, that part shall be separated from the rest and disposed of in accordance with the provisions of this Regulation.").

- **The scope of substances covered by the information obligation**

The regulatory framework only covers substances of very high concern (SVHC) on the candidate list that constituent more than 0.1% in the articles.

- **The verification of compliance will remain the responsibility of the national competent authorities.**
- **The practicality of access to information is under study.**

A description of the product will be requested, to make it easier for the consumer to understand. A photo may also be provided.

In principle, the correspondence between the product on the market and the database will be based on the description of the product, existing serial numbers or bar codes, and the categorisation of each product into article types and material types to facilitate users' searches.

Free text fields will be avoided as much as possible and notifiers may suggest new categories of materials or articles.

- **ECHA aims to be consistent with existing voluntary databases, but duplication will be possible.**

ECHA is studying what traceability tools are already available to industries such as the electronics, automotive or aeronautics industries in order to try as much as possible to integrate the compatibility of reports already made in the ECHA database, to avoid the need for a new entry of information.

- **A coherence with the LIFE AskREACH project is envisaged, but the two databases will first be independent**

## **XI.6. ECHA categorisation**

### **XI.6.1. PRODUCT CATEGORY (PC)**

PC 0: Other

PC 1: Adhesives, sealants

PC 2: Adsorbents

PC 3: Air care products

PC 4: Anti-freeze and de-icing products

PC 7: Base metals and alloys

PC 8: Biocidal products (e.g. disinfectants, pest control)

PC 9a: Coatings and paints, thinners, paint removes

PC 9b: Fillers, putties, plasters, modelling clay

PC 9c: Finger paints

PC 11: Explosives

PC 12: Fertilisers

PC 13: Fuels

PC 14: Metal surface treatment products

PC 15: Non-metal-surface treatment products

PC 16: Heat transfer fluids

PC 17: Hydraulic fluids

PC 18: Ink and toners

PC 19: Intermediate

PC 20: Products such as pH-regulators, flocculants, precipitants, neutralisation agents

PC 21: Laboratory chemicals

PC 23: Leather treatment products

PC 24: Lubricants, greases, release products

PC 25: Metal working fluids

PC 26: Paper and board treatment products

PC 27: Plant protection products

PC 28: Perfumes, fragrances

PC 29: Pharmaceuticals

PC 30: Photo-chemicals

PC 31: Polishes and wax blends

PC 32: Polymer preparations and compounds

PC 33: Semiconductors

- PC 34: Textile dyes, and impregnating products
- PC 35: Washing and cleaning products
- PC 36: Water softeners
- PC 37: Water treatment chemicals
- PC 38: Welding and soldering products, flux products
- PC 39: Cosmetics, personal care products
- PC 40: Extraction agents
- PC 41: Oil and gas exploration or production products
- PC 42: Electrolytes for batteries

#### **XI.6.2. SECTOR OF USE (SU)**

- SU 0: Other
- SU 1: Agriculture, forestry and fishing
- SU 2a: Mining (without offshore industries)
- SU 2b: Offshore industries
- SU 4: Manufacture of food products
- SU 5: Manufacture of textiles, leather, fur
- SU 6a: Manufacture of wood and wood products
- SU 6b: Manufacture of pulp, paper and paper products
- SU 7: Printing and reproduction of recorded media
- SU 8: Manufacture of bulk, large scale chemicals (including petroleum products)
- SU 9: Manufacture of fine chemicals
- SU 10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
- SU 11: Manufacture of rubber products
- SU 12: Manufacture of plastics products, including compounding and conversion
- SU 13: Manufacture of other non-metallic mineral products, e.g. plasters, cement
- SU 14: Manufacture of basic metals, including alloys
- SU 15: Manufacture of fabricated metal products, except machinery and equipment
- SU 16: Manufacture of computer, electronic and optical products, electrical equipment
- SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment
- SU 18: Manufacture of furniture
- SU 19: Building and construction work
- SU 20: Health services
- SU 23: Electricity, steam, gas water supply and sewage treatment
- SU 24: Scientific research and development

### XI.6.3. PROCESS CATEGORY (PROC)

PROC 0: Other

PROC 1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

PROC 2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

PROC 3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

PROC 4: Chemical production where opportunity for exposure arises

PROC 5: Mixing or blending in batch processes

PROC 6: Calendering operations

PROC 7: Industrial spraying

PROC 8a: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

PROC 8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities

PROC 9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

PROC 10: Roller application or brushing

PROC 11: Non industrial spraying

PROC 12: Use of blowing agents in manufacture of foam

PROC 13: Treatment of articles by dipping and pouring

PROC 14: Tableting, compression, extrusion, pelletisation, granulation

PROC 15: Use as laboratory reagent

PROC 16: Use of fuels

PROC 17: Lubrication at high energy conditions in metal working operations

PROC 18: General greasing /lubrication at high kinetic energy conditions

PROC 19: Hand-mixing with intimate contact and only PPE available.

PROC 20: Use of functional fluids in small devices

PROC 21: Low energy manipulation of substances bound in materials and/or articles

PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature.  
Industrial setting

PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature

PROC 24: High (mechanical) energy work-up of substances bound in materials and/or articles

PROC 25: Other hot work operations with metals

PROC 26: Handling of solid inorganic substances at ambient temperature

PROC 27a: Production of metal powders (hot processes)

PROC 27b: Production of metal powders (wet processes)

PROC 28: Manual maintenance (cleaning and repair) of machinery

#### **XI.6.4. ENVIRONMENTAL RELEASE CATEGORY (ERC)**

ERC 0: Other

ERC 1: Manufacture of substances

ERC 2: Formulation of preparations

ERC 3: Formulation in materials

ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles

ERC 5: Industrial use resulting in inclusion into or onto a matrix

ERC 6a: Industrial use resulting in manufacture of another substance (use of intermediates)ERC 6b: Industrial use of reactive processing aids

ERC 6c: Industrial use of monomers for manufacture of thermoplastics

ERC 6d: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers

ERC 7: Industrial use of substances in closed systems

ERC 8a: Wide dispersive indoor use of processing aids in open systems

ERC 8b: Wide dispersive indoor use of reactive substances in open systems

ERC 8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix

ERC 8d: Wide dispersive outdoor use of processing aids in open systems

ERC 8e: Wide dispersive outdoor use of reactive substances in open systems

ERC 8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix

ERC 9a: Wide dispersive indoor use of substances in closed systems

ERC 9b: Wide dispersive outdoor use of substances in closed systems

ERC 10a: Wide dispersive outdoor use of long-life articles and materials with low release

ERC 10b: Wide dispersive outdoor use of long-life articles and materials with high or intended release (including abrasive processing)

ERC 11a: Wide dispersive indoor use of long-life articles and materials with low release

ERC 11b: Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing)

ERC 12a: Industrial processing of articles with abrasive techniques (low release)

ERC 12b: Industrial processing of articles with abrasive techniques (high release)

ERC12c: Use of articles at industrial sites with low release

#### **XI.6.5. ARTICLE CATEGORY (AC)**

AC 0: Other

AC 1: Vehicles

AC 2: Machinery, mechanical appliances, electrical/electronic articles

AC 3: Electrical batteries and accumulators

AC 4: Stone, plaster, cement, glass and ceramic articles

AC 5: Fabrics, textiles and apparel

AC 6: Leather articles

AC 7: Metal articles

AC 8: Paper articles

AC 10: Rubber articles

AC 11: Wood articles

AC 13: Plastic articles

AC 31: Scented clothes

AC 32: Scented eraser

AC 34: Scented toys

AC 35: Scented paper articles

AC 36: Scented CD

AC 38: Packaging material for metal parts, releasing grease/corrosion inhibitors

AC10a: Rubber articles: Large surface area articles e.g. Construction and building materials (e.g. flooring)

AC10b: Rubber articles: Toys intended for children's use (and child dedicated articles) (e.g. baby bottle nipples, soothers)

AC10c: Rubber articles: Packaging (excluding food packaging)

AC10d: Rubber articles: Articles intended for food contact

AC10e: Rubber articles: Furniture & furnishings, including furniture coverings

AC10f: Rubber articles: Articles with intense direct dermal contact during normal use (e.g. gloves, boots, clothing, rubber handles, gear lever, steering wheels)

AC10g: Other rubber articles

AC11a: Wood articles: Large surface area articles (e.g. Construction and building materials (e.g. floor, claddings)

AC11b: Wood articles: Toys intended for children's use (and child dedicated articles)

AC11c: Wood articles: Packaging (excluding food packaging)

AC11d: Wood articles: Articles intended for food contact

AC11e: Wood articles: Furniture & furnishings

AC11f: Wood articles: Articles with intense direct dermal contact during normal use (e.g. handles, pencils)

AC11g: Other wood articles

AC13a: Plastic articles: Large surface area articles (e.g. Construction and building materials e.g. flooring, insulation)

- AC13b: Plastic articles: Toys intended for children's use (and child dedicated articles) includes baby-bottles
- AC13c: Plastic articles: Packaging (excluding food packaging)
- AC13d: Plastic articles: Articles intended for food contact (e.g. plastic dinner ware, food storage)
- AC13e: Plastic articles: Furniture & furnishings, including furniture coverings
- AC13f: Plastic articles: Articles with intense direct dermal contact during normal use (e.g. handles, ball pens)
- AC13g: Other plastic articles
- AC1a: Vehicles covered by End of Life Vehicles (ELV) directive (e.g. personal vehicles, delivery vans)
- AC1b: Other vehicles (e.g. boat, train, metro, planes)
- AC2a: Machinery, mechanical appliances, electrical/electronic articles covered by the Waste Electrical and Electronic Equipment (WEEE) directive (e.g. refrigerators, washing machines, vacuum cleaners, computers, telephones, drills, saws, smoke detectors, thermostats, radiators)
- AC2b: Other machinery, mechanical appliances, electrical/electronic articles (e.g. large-scale stationary industrial tools)
- AC4a: Stone, plaster, cement, glass and ceramic articles: Large surface area articles (e.g. Construction and building materials (e.g. floor coverings, isolation articles))
- AC4b: Stone, plaster, cement, glass and ceramic articles: Toys intended for children's use (and child dedicated articles)
- AC4c: Stone, plaster, cement, glass and ceramic articles: Packaging (excluding food packaging)
- AC4d: Stone, plaster, cement, glass and ceramic articles: Articles intended for food contact (e.g. dinner ware, drinking glasses, pots, pans, food storage containers)
- AC4e: Stone, plaster, cement, glass and ceramic articles: Furniture & furnishings
- AC4f: Stone, plaster, cement, glass and ceramic articles: Articles with intense direct dermal contact during normal use (e.g. jewellery)
- AC4g: Other articles made of stone, plaster, cement, glass or ceramic
- AC5a: Fabrics, textiles and apparel: Large surface area articles e.g. Construction and building materials e.g. floor or wall materials: carpets, rugs, tapestries
- AC5b: Fabrics, textiles and apparel: Toys intended for children's use (and child dedicated articles) (e.g. stuffed toys, blankets, comfort objects)
- AC5c: Fabrics, textiles and apparel: Packaging (excluding food packaging)
- AC5d: Fabrics, textiles and apparel: Articles intended for food contact
- AC5e: Fabrics, textiles and apparel: Furniture & furnishings, including furniture coverings (e.g. sofa cover, car seat cover, fabric chair, hammock)
- AC5f: Fabrics, textiles and apparel: Articles with intense direct dermal contact during normal use (e.g. clothing, shirts, pants, shorts)
- AC5g: Fabrics, textiles and apparel: Articles with intense direct dermal contact during normal use: bedding and mattresses (e.g. blankets, sheets)

- AC5h: Other articles made of fabrics, textiles and apparel
- AC6a: Leather articles: Large surface area articles (e.g. Construction and building materials)
- AC6b: Leather articles: Toys intended for children's use (and child dedicated articles)
- AC6c: Leather articles: Packaging (excluding food packaging)
- AC6d: Leather articles: Articles intended for food contact
- AC6e: Leather articles: Furniture & furnishings, including furniture coverings e.g. sofa, car seat, chair
- AC6f: Leather articles: Articles with intense direct dermal contact during normal use (e.g. clothing such as jackets, shoes, or gloves)
- AC6g: Other leather articles (e.g. domestic articles such as decoration articles, leather boxes)
- AC7a: Metal articles: Large surface area articles Construction and building materials (e.g. roof sheets, pipes)
- AC7b: Metal articles: Toys intended for children's use (and child dedicated articles)
- AC7c: Metal articles: Packaging (excluding food packaging)
- AC7d: Metal articles: Articles intended for food contact (e.g. packaging containers, metal tins, knives, cooking pots)
- AC7e: Metal articles: Furniture & furnishings (e.g. outdoor furniture, benches, tables)
- AC7f: Metal articles: Articles with intense direct dermal contact during normal use (e.g. handles, jewellery)
- AC7g: Other metal articles
- AC8a: Paper articles: Large surface area articles Construction and building materials (e.g. insulation panels, wall papers)
- AC8b: Paper articles: Toys intended for children's use (and child dedicated articles)
- AC8c: Paper articles: Packaging (excluding food packaging)
- AC8d: Paper articles: Articles intended for food contact
- AC8e: Paper articles: Furniture & furnishings
- AC8f1: Paper articles: Articles with intense direct dermal contact during normal use: personal hygiene articles (e.g. nappies, feminine hygiene products, adult incontinence products, tissues, towels, toilet paper)
- AC8f2: Paper articles: Articles with intense direct dermal contact during normal use: printed articles with dermal contact in normal conditions of use (e.g. newspapers, books, magazines, printed photographs)
- AC8g: Other paper articles (e.g. lampshades, paper lanterns)