



# PROMISCES

Preventing Recalcitrant Organic Mobile Industrial chemicals for Circular Economy in the Soil-sediment-water system

---

SUMMARY OF THE PM(T) ONLINE SURVEY RESULTS - MAY-JULY 2022  
(VERSION 1 - JANUARY 2023)

# PROMISCES

**Full title:** Preventing Recalcitrant Organic Mobile Industrial chemicals for Circular Economy in the soil-sediment-water System

**Coordinator:** Philippe Negrel (BRGM)

**Deputy Coordinator:** Julie Lions (BRGM)

**Communication Leader:** Nicole Heine (DECHEMA)

**Beneficiaries:** 27 partners

**Type of Action:** RIA

**EU contribution:** 12M€

**Duration:** 01/11/2021 - 30/04/2025

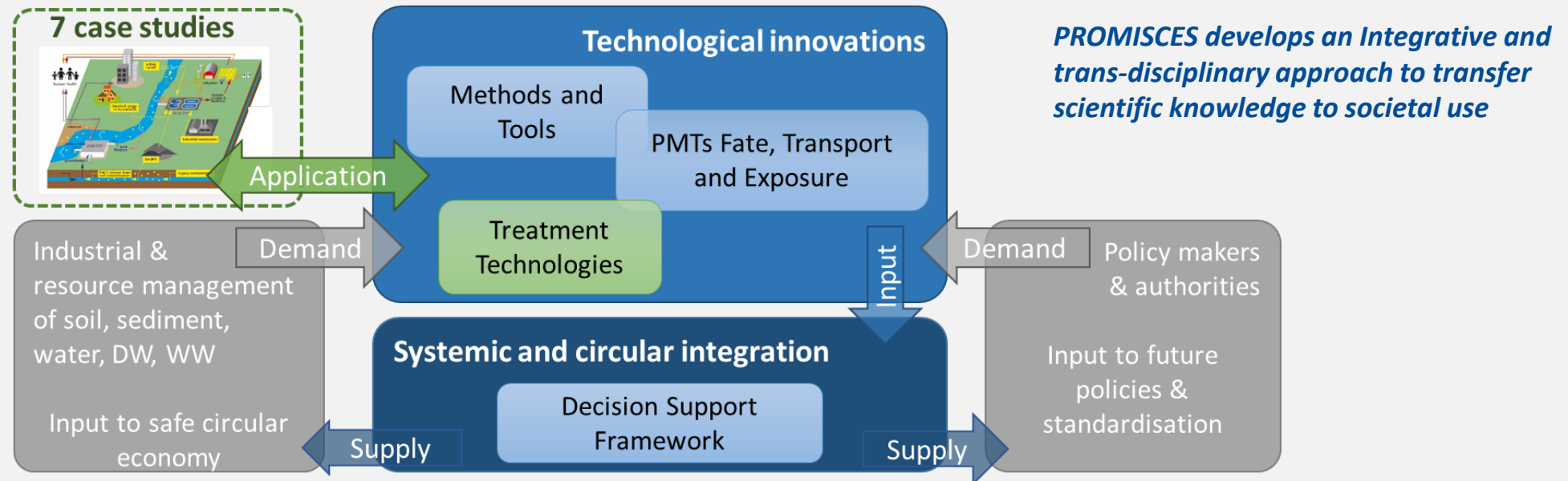
**Call:** H2020-LC-GD-2020-3

**Topic:** LC-GD-8-1-2020 - Innovative, systemic zero-pollution solutions to protect health, environment, and natural resources from persistent and mobile chemicals



## Project objective

Identify how **very Persistent, very Mobile and potentially Toxic substances** (PM(T)/vPvM) in the **soil-sediment-water system** (e.g. PFAS) prevent the deployment of the circular economy and which strategies help overcome key bottlenecks.



## Decision Support Framework for risk management of PM(T) in a circular economy

**Lead: INERIS & RIVM**

Develops a novel **decision support framework (DSF)** to support decisions on preventing, mitigating and remediating PM(T) substances in the environment.

The DSF will serve product designers, risk managers and policy-makers in building zero pollution strategies for safe reuse of resources in the circular economy.

The DSF will be fed by all PROMISCES activities and existing databases. It will integrate three key modules:

- **Diagnosis**, to identify the most critical endpoints and PM(T) groups hindering transition towards a circular economy;
- **Solutions**, to search for solutions and assess their performance, taking into account a wide range of parameters, such as PM(T) characteristics, costs and social benefit;
- **Strategies**, to learn how to co-create with relevant stakeholders a risk management strategy for PM(T)-use combinations, with a portfolio of solutions that together can solve both short-term (mitigation and remediation) and long-term (prevention and substitution) PM(T) pollution concerns in a CE context.

Also distill the discoveries in PROMISCES into **policy recommendations**.



# Stakeholder online survey

---

## Goals and process



# Stakeholder online survey

Survey on EU Survey - 23 may 2022 to 23 July 2022- Stakeholder views and needs regarding Persistent, Mobile (and Toxic) substances in the Circular Economy.

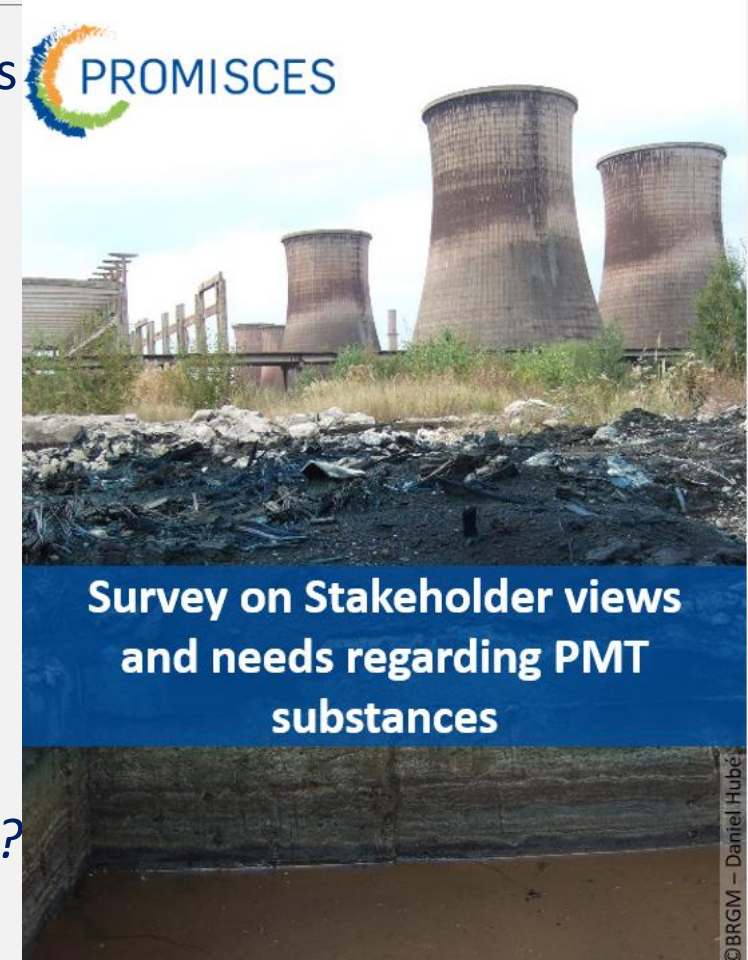
✧ EUSurvey

## Online Survey

Stakeholder views and needs regarding Persistent, Mobile (and Toxic) substances in the Circular Economy

*We need your feedback to find out:*

- *What is needed to better handle/manage PM(T) substances?*
- *What are the good practices / experience that you would like to share?*



# Stakeholder online survey

---

## Aims

PROMISCES must provide innovative approaches to prevent and manage the occurrence of PM(T) substances with a focus on compounds of persistent and mobile compounds of industrial origin to support the Zero Pollution and Circular Economy Action Plans.

A complex challenge :

- Transfer of novel knowledge on PM substances
- Interdisciplinary solutions
- Numerous stakeholders

➡ Integrating the useful information and tools in a Decision Support Framework (DSF)

The feedback of this survey will help us to better pinpoint the critical environmental, technical and economic issues about relevant groups of substances of concern among industrial chemicals. The results of the questionnaire will be used to position and prioritise expectations and support the design of a Decision Support Framework (DSF).

# Main conclusions

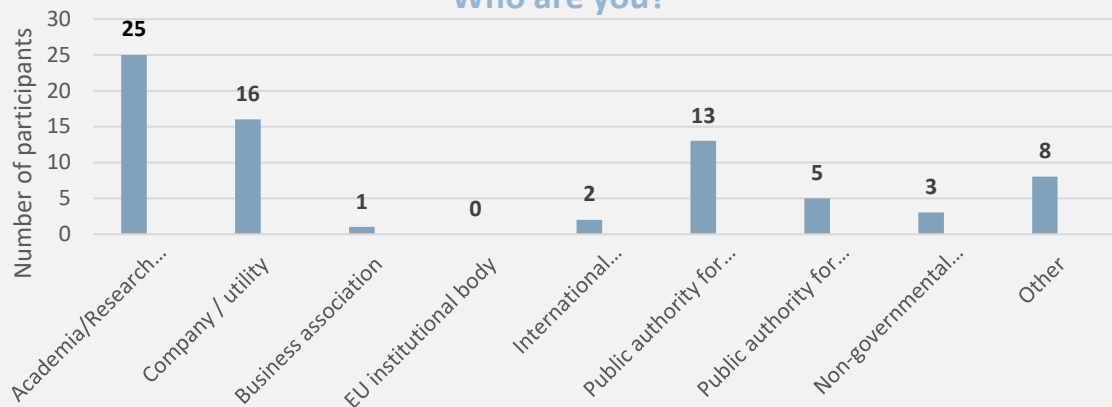
---

- ✓ 84% of the 80 participants claim to be really concerned by the issues related to the PM(T).
- ✓ The two groups of PM(T) substances that appear to be of most interest to the participants are PFAS and halogenated solvents.
- ✓ We observed a large confusion between PFAS and PM(T)s. For instance many respondents were surprised not to find more PFAS in the UBA list (which is a benchmark for the identification of PM(T)s).
- ✓ Analytical difficulties are an important topic. Among the most cited are: (i) the difficulty to reach detection limits, and (ii) the access to affordable analytical methods.
- ✓ The most cited source of the critical PM(T)s is industry.
- ✓ Most of the respondents expressed the need for research and better information on potential prevention and treatment solutions.
- ✓ Only the polymer sector was mentioned as already active in the development of innovative initiatives on the substitution of PM(T) substances.
- ✓ Only 9% of the respondents already use a dedicated tool or framework to support their decisions on PM(T) management.
- ✓ We received answers from utilities, local authorities and solution providers. Conversely, chemical producers and users did not respond to our requests.

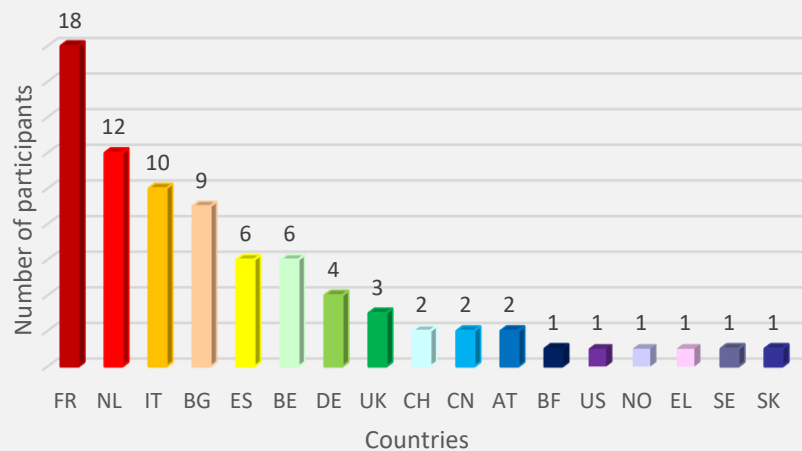
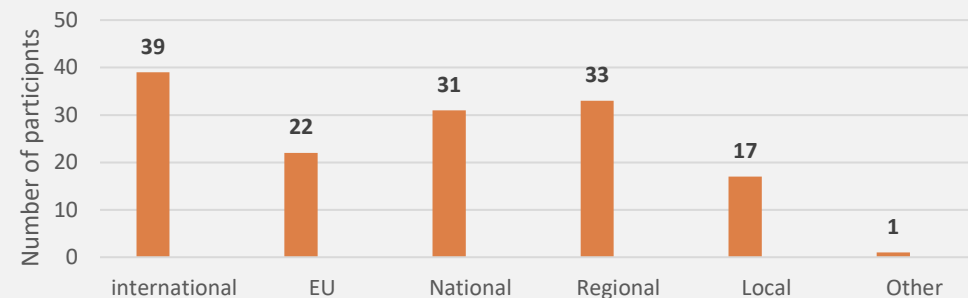


## Who answered ?

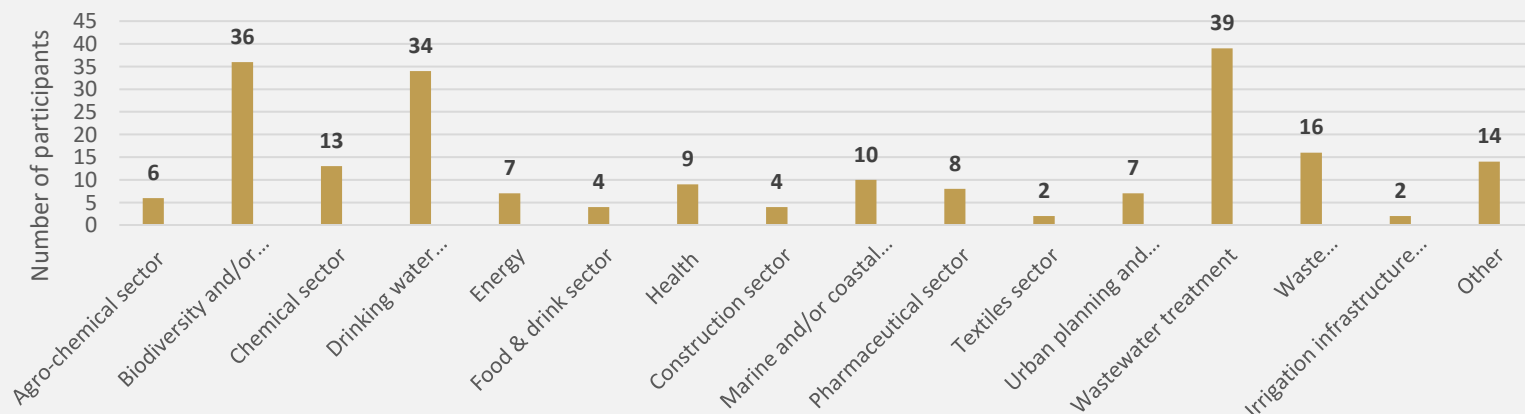
### Who are you?



### At which level does your organisation operate?



### In which sector are you active?



# Stakeholder online survey

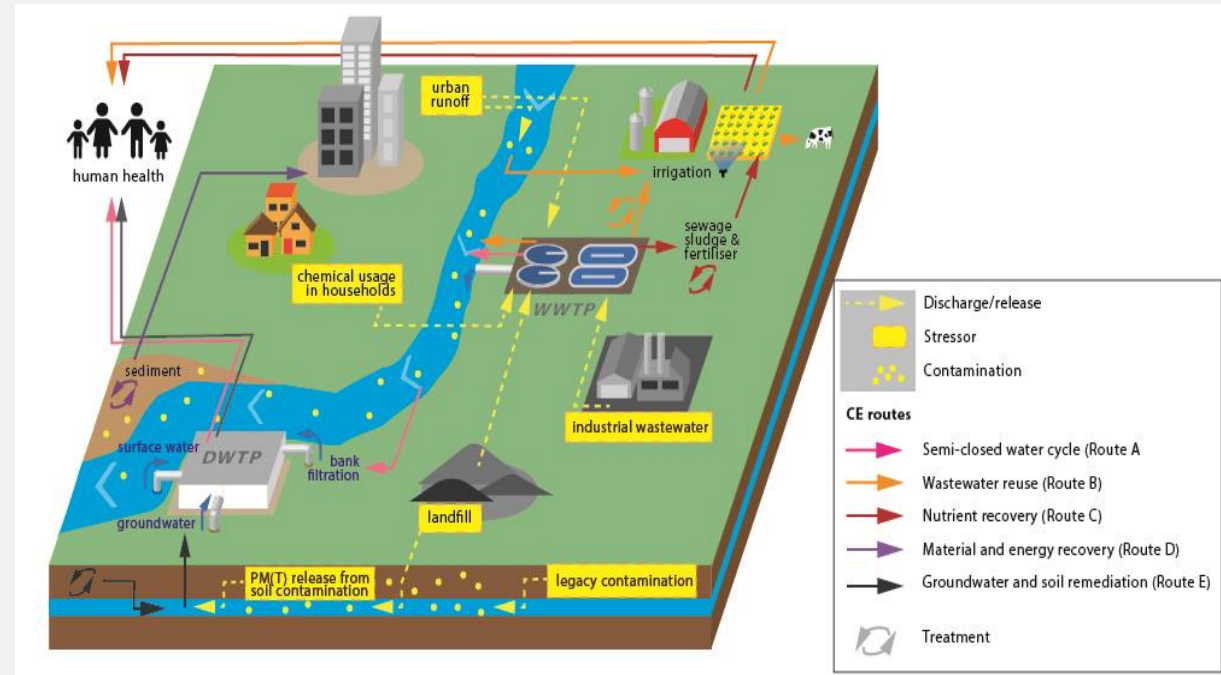
---

## **PM(T) as a new concern**

# **Monitoring occurrence and assessing risks of chemicals**

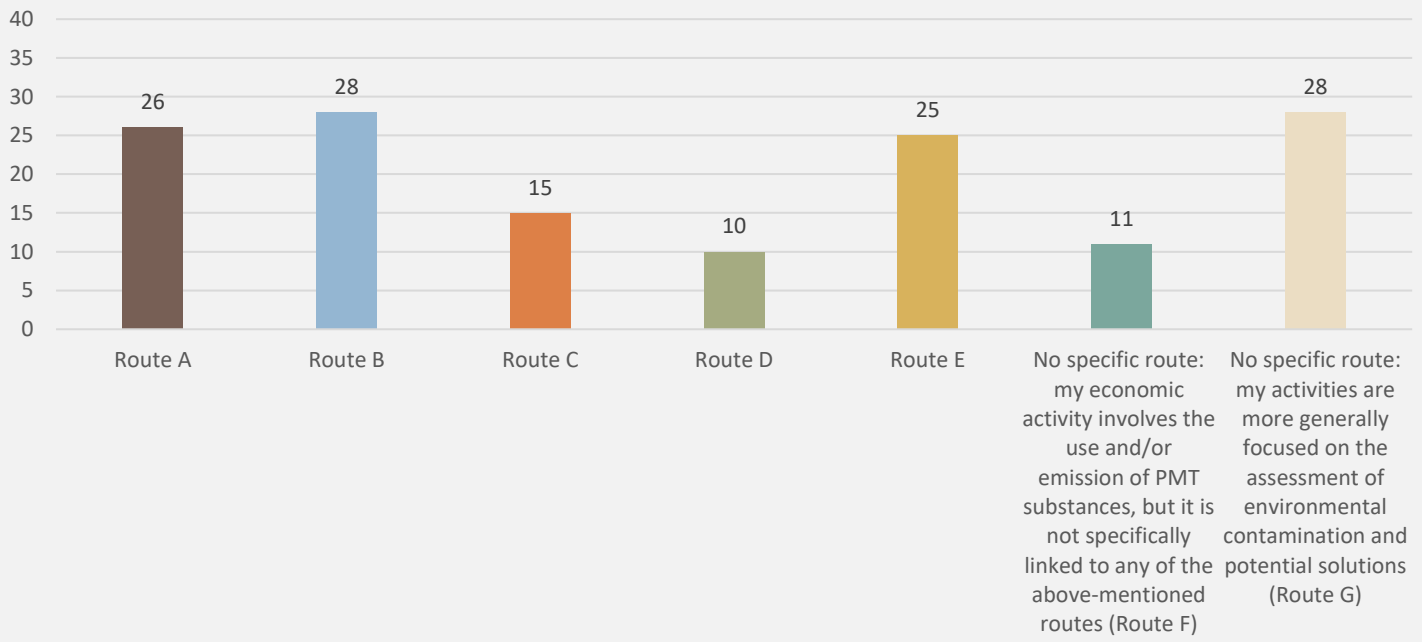
## Circular economy routes of interest

- A. semi-closed water cycles for drinking water supply at urban and catchment scale
- B. wastewater reuse for irrigation in agriculture
- C. nutrient recovery from sewage sludge
- D. material recovery from dredged sediment
- E. groundwater and land remediation for safe reuse in urban areas
- F. No specific route: my economic activity involves the use and/or emission of PM(T) substances, but it is not specifically linked to any of the above-mentioned routes (e.g. WWTP, industrial manufacturing activities)
- G. No specific route: my activities are more generally focused on the assessment of environmental contamination and potential solutions (e.g. environmental agencies, NGOs).

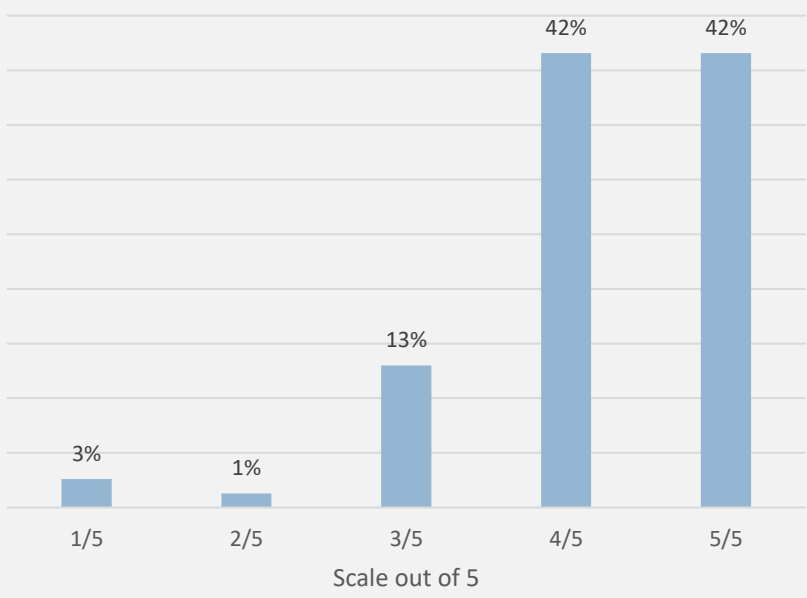


# Circular economy routes of interest

Groups of PM(T) identified as a concern (% of respondents - all routes)  
Total: 80 participants

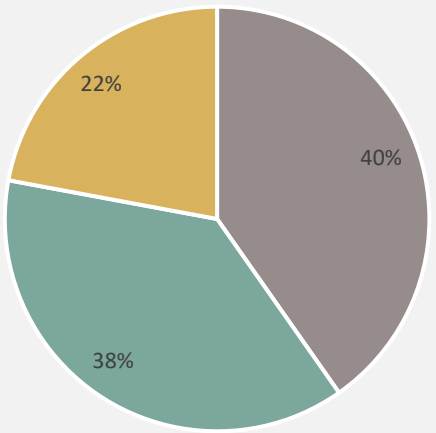


Level of concern of the stakeholders  
(1/5: low concern – 5/5: very concerned)



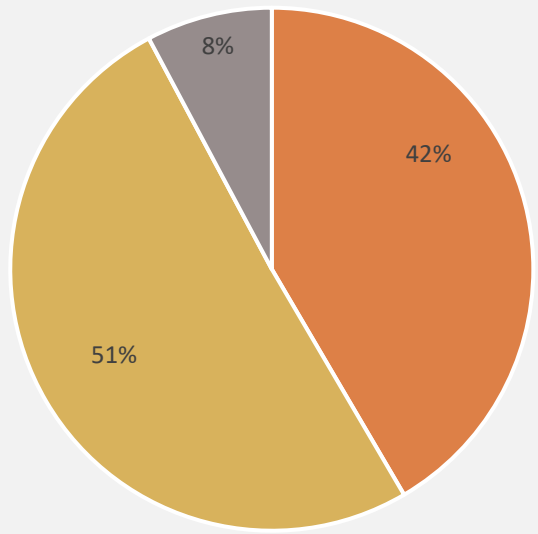
## Definition of PM(T)

% of participants who are aware of the PM(T)/vPvM criteria proposed by UBA.  
<https://www.umweltbundesamt.de/en/the-final-pmtvpvm-criteria-after-public>



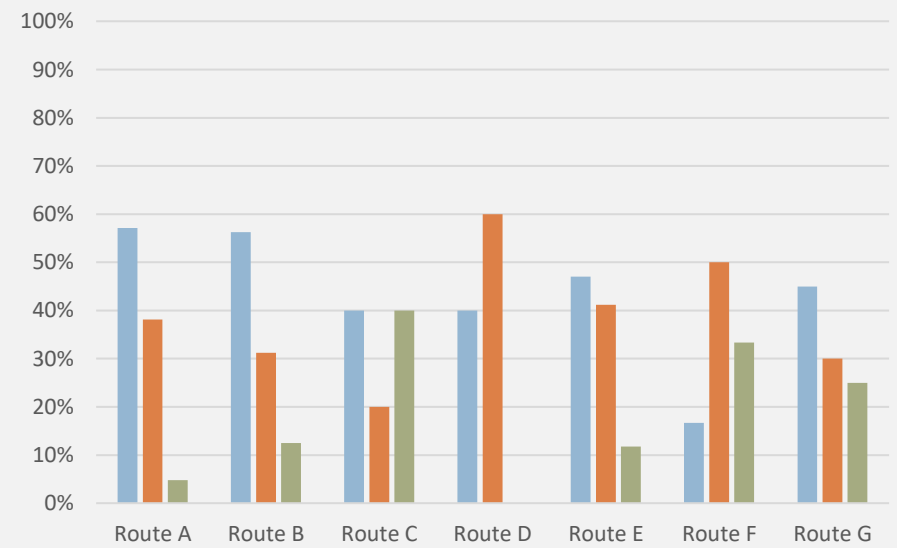
■ Yes, but not very detailed ■ No, until now  
 ■ Yes, fully aware

Agree with UBA criteria



■ Yes ■ No opinion ■ No

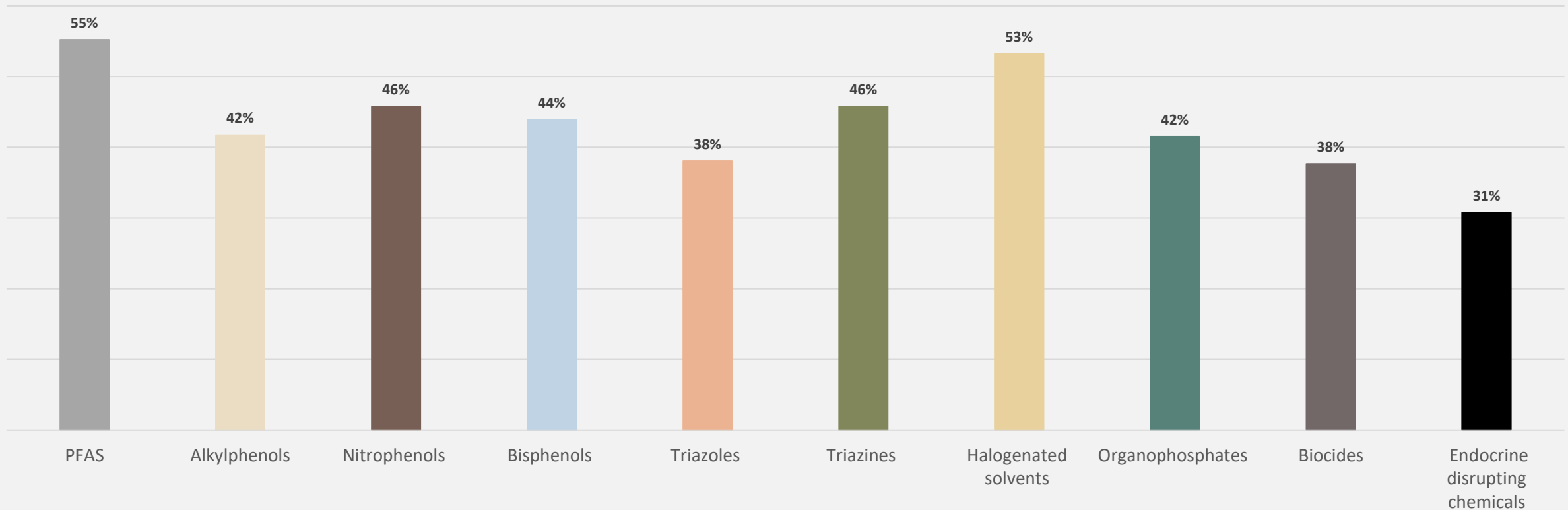
Does the UBA list ([https://zenodo.org/record/3637611#\\_yoYVD6hb\\_y5c](https://zenodo.org/record/3637611#_yoYVD6hb_y5c)) include all the PM(T) substances you are concerned about?



■ Yes ■ No ■ No answer

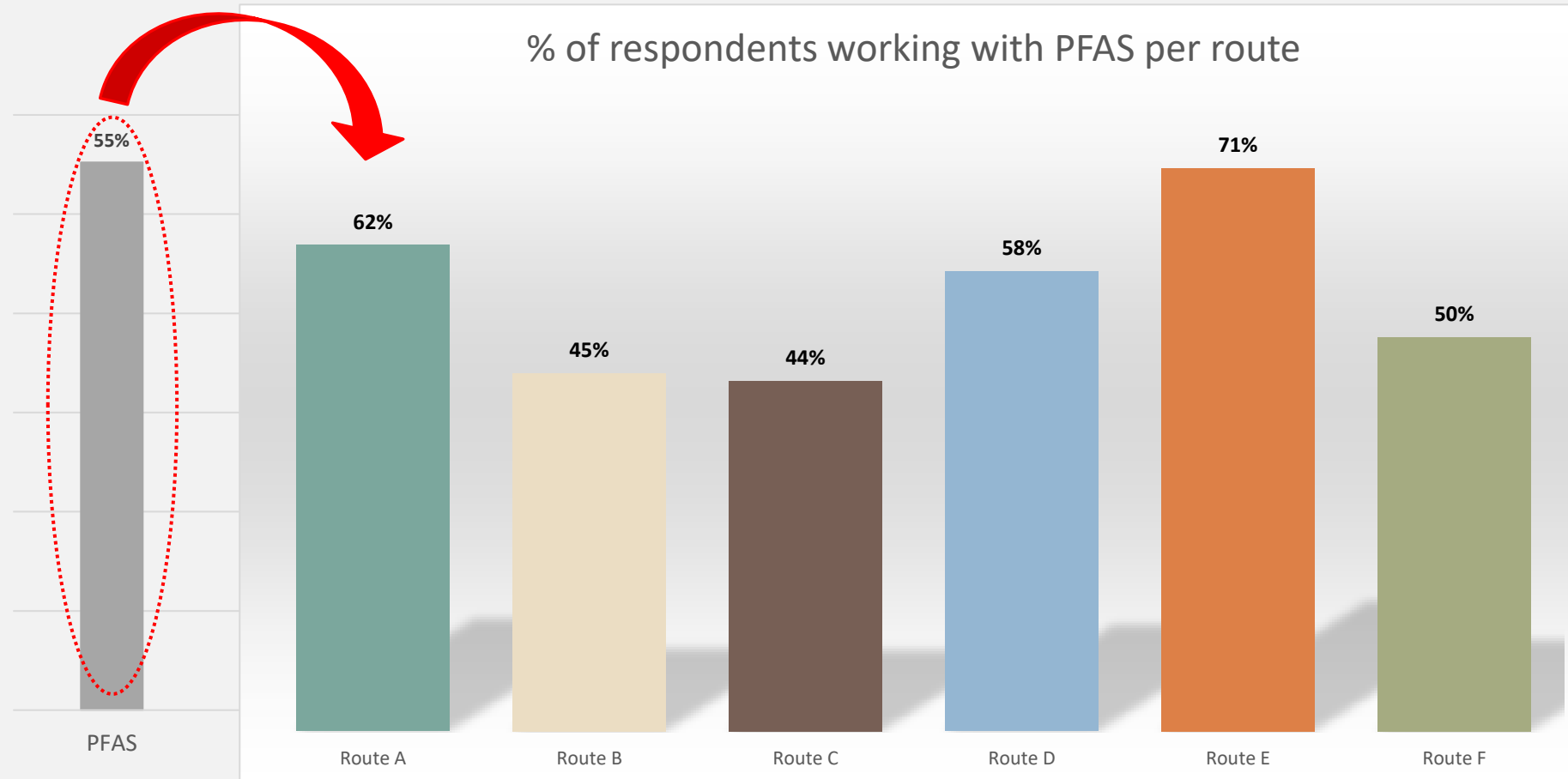
# Substances of concern

% of respondents working with different families of substances for all routes



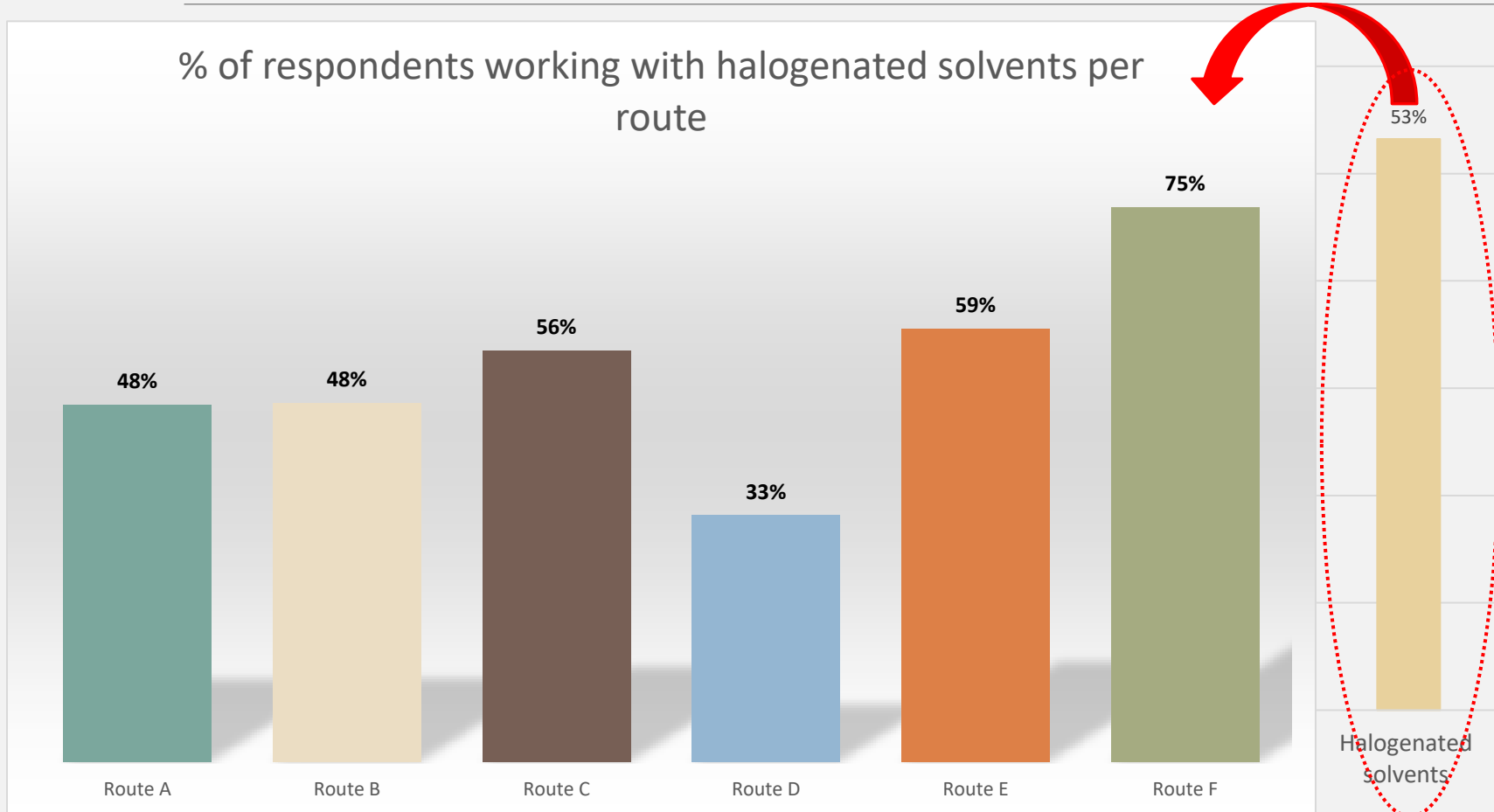


# Substances of concern



e.g. 71% of respondents working in Route E work with PFAS whereas only 44% in Route C.

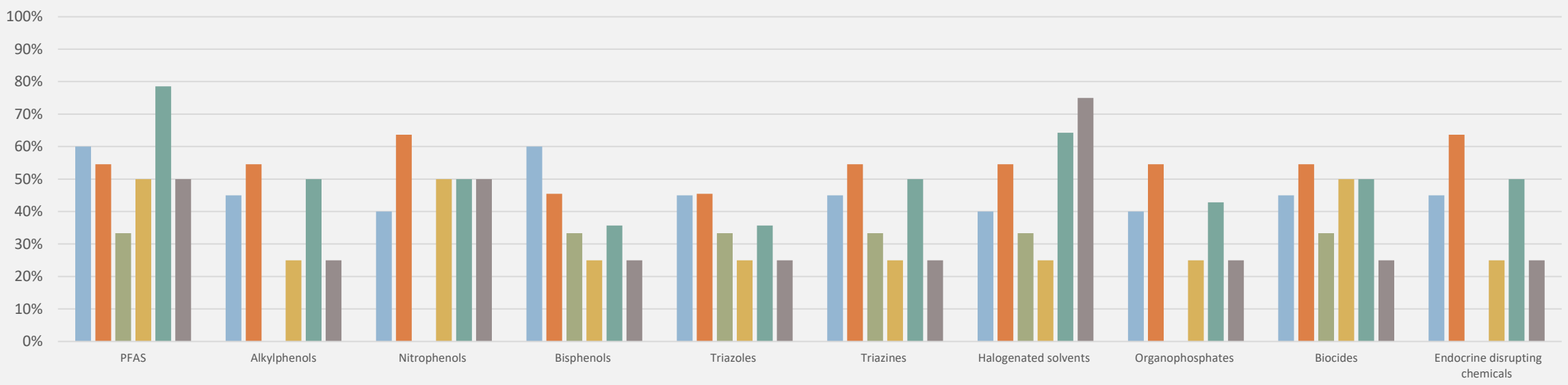
# Substances of concern



e.g. 75% of respondents working in Route F work with halogenated whereas only 33% in Route D.

# Substances of concern

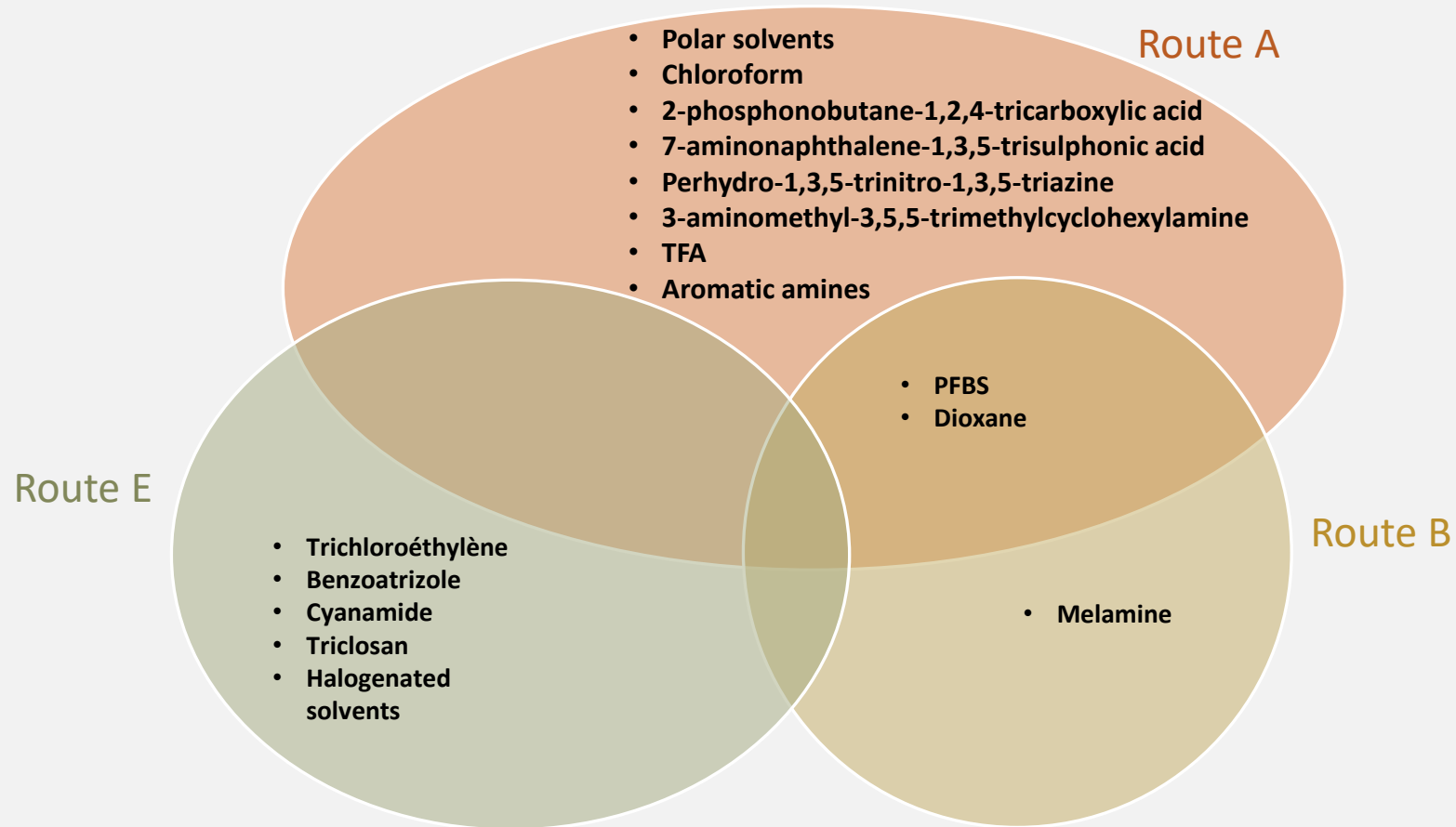
% of respondents interested by the substance



- Route A (Total :20 answer /21 people) Of interest for quality of your product (DW)
- Route C (Total :3 answer /5 people) Of interest for quality of nutrient recycling
- Route E (Total : 14 answer /17 people) Of interest for quality of groundwater / soil

- Route B (Total :11 answer /16 people) Of interest for quality of water for reuse in agriculture
- Route D (Total : 4answer /5 people) Of interest for quality of nutrient recycling
- Route F (Total : 4 answer / 6 people) Of interest for your environmental emissions permit

# Top individual compounds of interest on the UBA PM(T) list



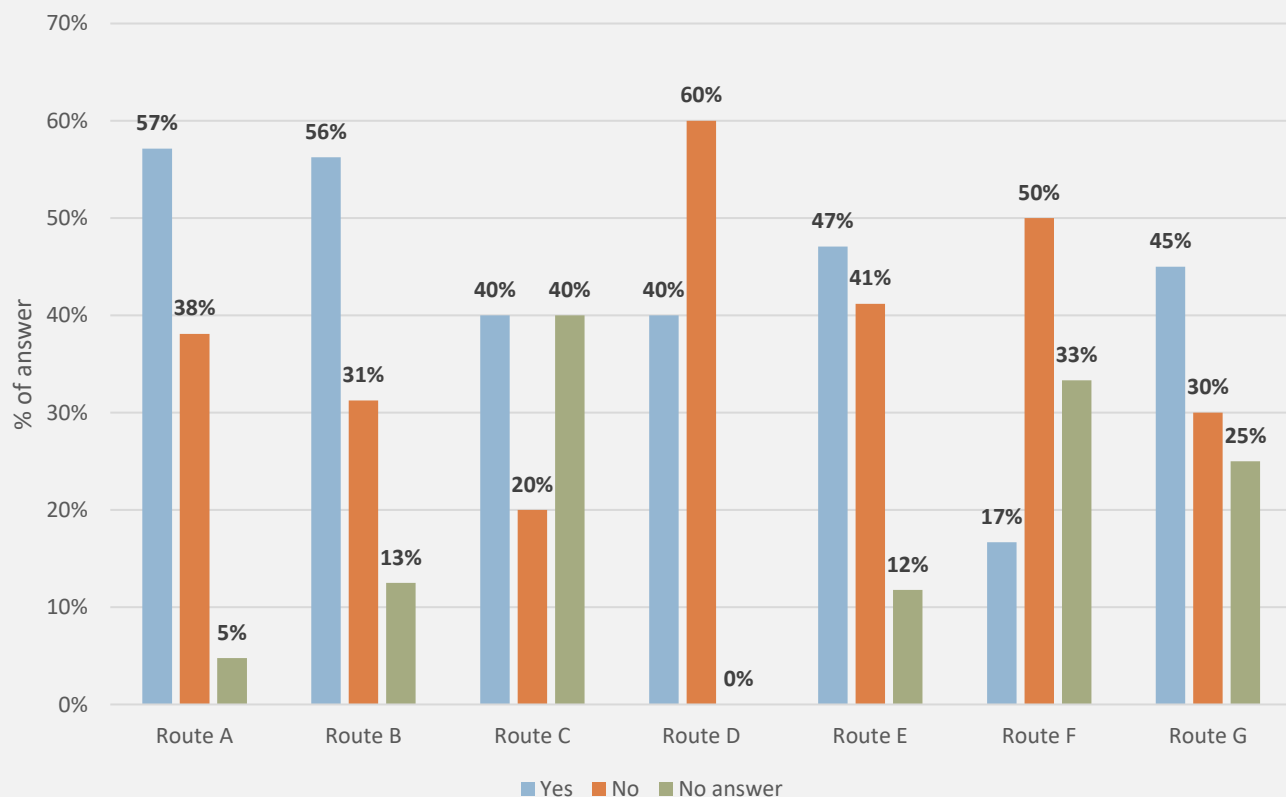
NB:

(1) No individual compounds were mentioned for the other routes.

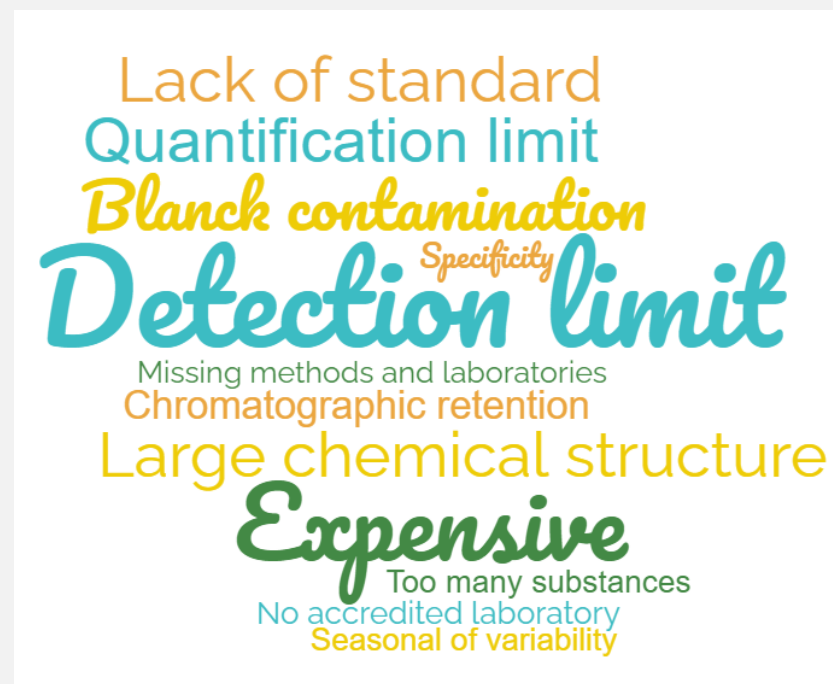
(2) A confusion has been observed between PFAS and PM(T)s. Some PFAS were frequently mentioned as individual compounds of concern whereas they are not on the UBA list.

# Analytical difficulties

Are you affected by any analytical difficulty in the monitoring of PM(T) substances in your process?



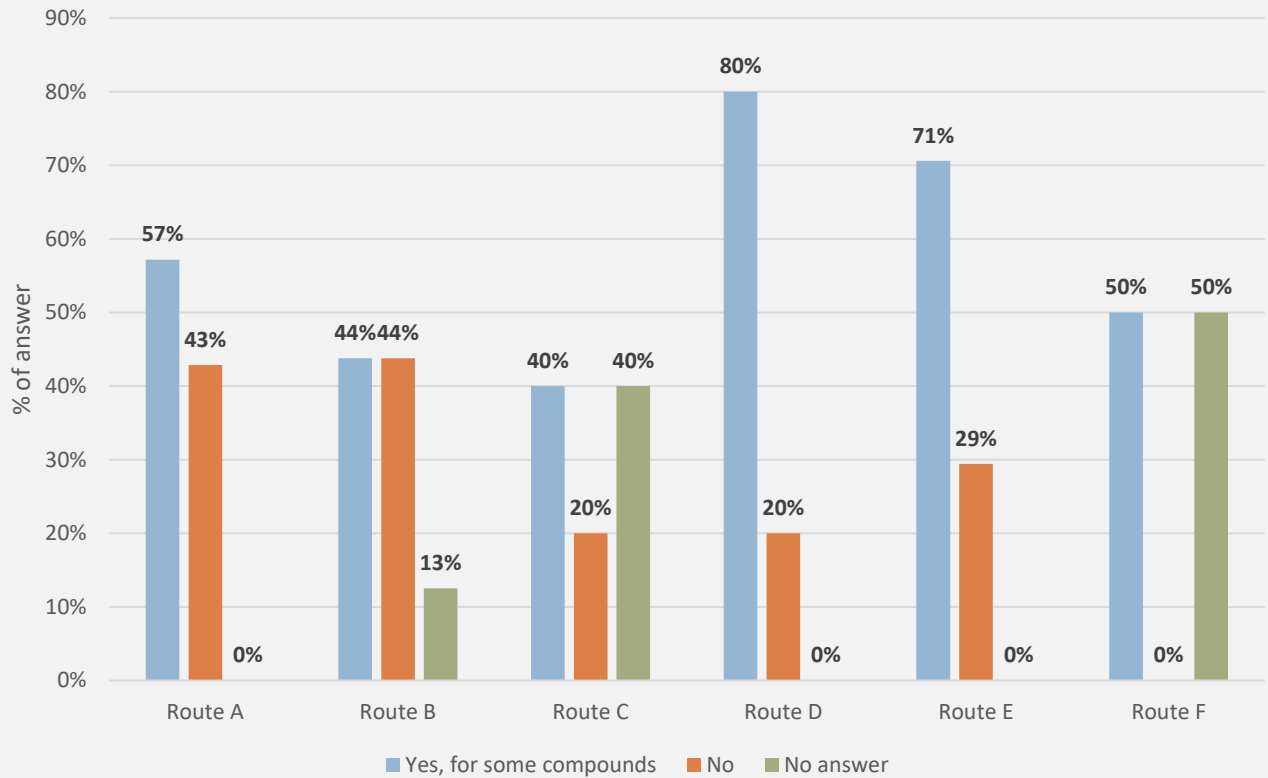
Indicate the most difficulties:



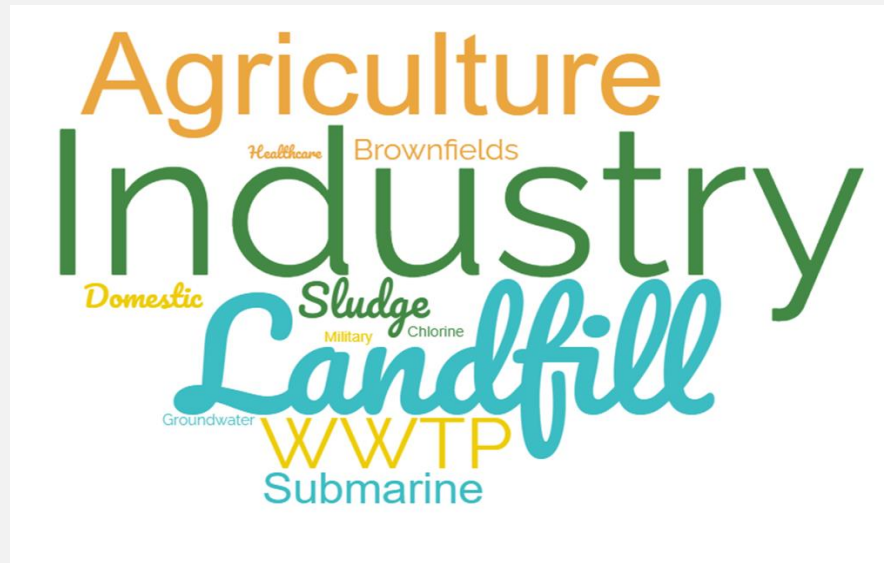
***\*Word cloud of answers***

# Analytical difficulties

Do you know the sources of the critical PM(T) compounds in your process?



The most significant sources (All routes):



**\*Word cloud of answers**



# Stakeholder online survey

---

## Treatment and solutions

# Information on solutions

---

Involvement in the design or implementation of solutions for safe management of PM(T)s

- Around half of the respondents declared they were involved
- Proportionally more for route E (71%), and less for route D (20%)

For each route, technical solutions were proposed but the results are too heterogeneous to be presented. Solutions for PFAS management will be the subject of **specific work in 2023 and 2024.**

But most of the respondents expressed the need for research and better information on potential solutions...

- Almost no database of available solutions was mentioned
- The few ones available were confidential
- Almost no evaluations (efficiency, availability, costs, acceptability, etc.)
- Expert groups or networks were suggested as a reference

... And several comments stressed the need for prevention solutions

- Source control
- Restriction of the use of PM(T)s through regulation
- Regulation and monitoring of industrial and WWTP discharges
- PFAS were systematically mentioned as the most challenging PM(T)s to substitute + pharmaceuticals

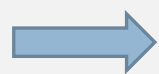
# Information on solutions

---

We asked for sector initiatives aiming at minimising discharges of PM(T)/vPvM substances into the environment and human exposure to those substances among the following sectors:

- Polymers
- Adhesive, sealants
- Coatings
- Laboratory chemicals
- Textile and leather treatments
- Washing and cleaning products
- Cosmetics
- Surface treatment
- Lubricants

But only the polymer sector was mentioned as already active in the development of innovative initiatives on PM(T) substances.



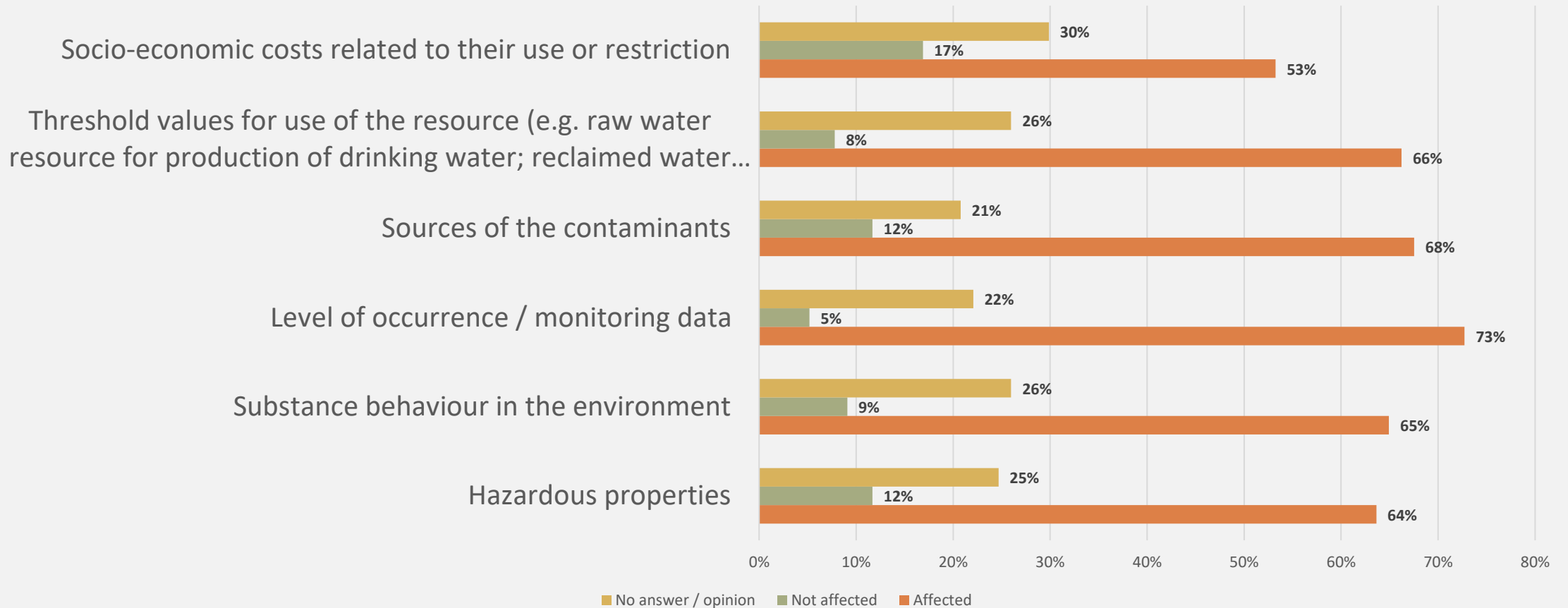
Providing harmonised and relevant information on solutions will be a great challenge in the DSF

# Stakeholder online survey

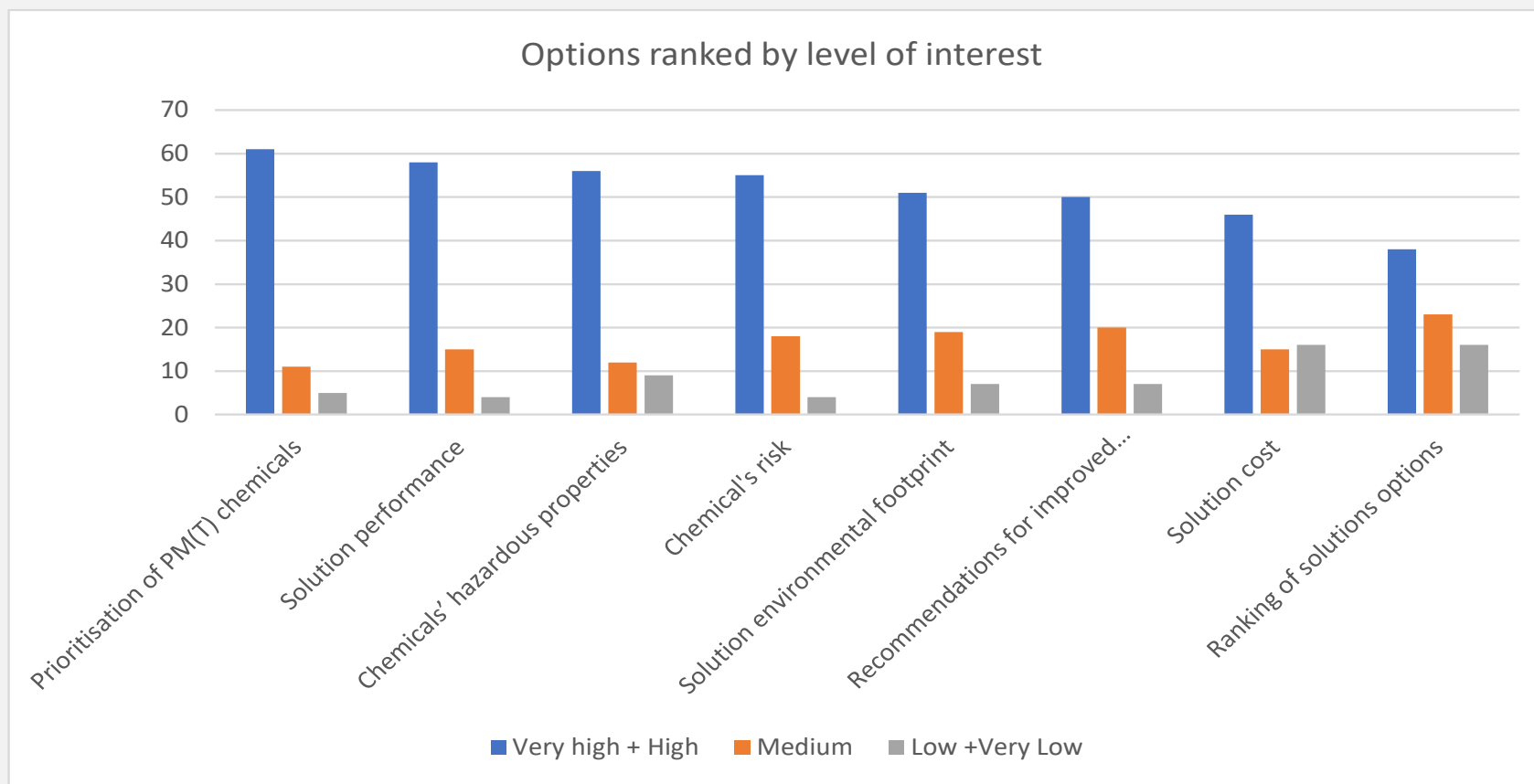
---

## About the Decision Support Framework

# Gaps/Needs on PM(T)



## What type of information would you like to find in a Decision Support Framework ?





# Stakeholder online survey

---

## Conclusion

# Dedicated tools to support decision making

---

Only 9% of the respondents already use a dedicated tool or framework to support their decisions on PM(T) management:

- Those tools are generally in-house tools
- German guidance documents were also mentioned

Chemical producers and users did not respond to our requests → Need to find a way to reach them or change our PROMISCES target groups.

Solutions providers did respond → whereas current PROMISCES target groups are utilities, local authorities and producers, it may be relevant to identify service providers as potential targets for the DSF...

The different functions and features we have in mind for the DSF seem to meet a clear need.

# Dedicated tools to support decision making

---

The following inspiring examples\* were suggested:

- R. Servien, C. Leenknecht, K. Bonnot, V. Rossard, E. Latrille, L. Mamy, P. Benoit, A. H´elias, D. Patureau, "Improved impact assessment of micropollutants release from WWTPs" (2022) <https://doi.org/10.1016/j.cscee.2021.100172>
- WHO water safety plans
- Cyanotoxin management
- A tool to evaluate the removal efficiency of pharmaceuticals in WWT (RIVM)

\*not necessarily in the field of PM(T) substances

# Relevant documents or resources shared with us

**Drinking water relevant substances in the Meuse**

An update of the lists with substances that are relevant for the production of drinking water from the river Meuse

RIWA-Meuse

**cornelsen**

Water Treatment • PFAS Treatment • Remediation Technologies

**PerfluorAd**

**AFFF Fire Extinguishing System Rinsing & Treatment**

This technology is suitable for:
 

- Mobile fire engines, boats & fire boats, rinsing and flushing out the systems, tanks, and gun-purifying piping in essential.
- However, residual PFAS compounds in the system leads to engine and long term re-contamination of these residues.

 Just 3 to 5 flushes with PerfluorAd™ from a typical starting concentration of 40,000 µg/l PFAS leaves a residual concentration of 0.99 µg/l, a 99.9% removal. Subsequent bleeding, or recontamination is then entirely prevented.

PerfluorAd™ represents an efficient and cost-effective solution to both flushing the system and treating the rinse water.

www.pflafluorad.com

**ecetoc**

**Persistent chemicals and water resources protection**

Technical Report No. 139

Abstract: This report provides a survey of per- and polyfluoroalkyl substances (PFAS) and highlights approaches to manage risks and liabilities associated with their impact to the environment.

**EFFECTS OF HYGIENIZED URINE AND FAECES ON THE PREVALENCE OF ENDEMIC BILHARZIASIS: CASES OF TWO VILLAGES OF BOUAFLE IN THE IVORY COAST**

**EFFETS DE L'URINE ET FÈGES HYGIENISÉS SUR LA PRÉVALENCE DES BILHARZIOSES ENDEMIQUES: CAS DE DEUX VILLAGES EN CÔTE D'IVOIRE**

Received 14 Nov. 2018  
Accepted: 20 Dec. 2018  
On line 13 Dec. 2018

YAP ELLIÈLE AJIME MARUET\*, NYIRUMAH TANOH AMAN SEYRE BARMON\*, OUSSEINE THOMPSON\* & THOMAS COSSA\*

Abstract: Bilharziasis is a disease linked to poor hygiene and sanitation, which is a major public health problem in Côte d'Ivoire, particularly in the sanitary district of Bouaflé. In addition to chemotherapy, productive sanitation could be an effective means of controlling this disease. The objective of the study was to determine the effects of productive sanitation on the prevalence of schistosomiasis in Bouaflé and North Diabou, two villages in the sanitary district of Bouaflé where the disease is endemic. Pre-project (June-July 2014) and post-project (June-July 2014) prevalence surveys were conducted in Bouaflé and North Diabou. The urinary frequency and faecal-urinary techniques were used for screening schistosoma in a sample of 100 people selected from 100 households per village. The productive sanitation project was carried out only in Bouaflé during the two years. Before the project, the respective prevalence rates of urinary and faecal-urinary schistosomiasis were 24% and 27% in Bouaflé; they were 14% and 14% in North Diabou. In Bouaflé, during the productive sanitation project, 442.40 m<sup>3</sup> of urine and 184.24 tonnes of faeces produced and hygienized for agriculture significantly reduced defecation and urination in the open. After the project, the respective prevalence rates of urinary and faecal-urinary schistosomiasis were 5% in Bouaflé; they were 12% and 14% in North Diabou. There was a significant difference in prevalence of urinary (p < 0.002) and faecal-urinary (p < 0.002) schistosomiasis in Bouaflé after the productive sanitation project. Productive sanitation can be put forward as a means of controlling schistosomiasis and increasing crop yield.

**MICROPOLLUTANTS IN WWTPS - REMOVAL & MONITORING**

Towards a first full scale micropollutants tertiary treatment in Flanders (BE): Impact and decisions for design and monitoring

B. Raes\*, M. De Jonghe\*\*, K. Duwaes\*\*, J. Severyns\* and M. Wiermans\*

Abstract: Micropollutants (MPs) are hazardous organic compounds that are not removed by conventional wastewater treatment. This paper presents the results of a study on the removal of micropollutants in a full-scale wastewater treatment plant (WWTP) in Flanders, Belgium. The study focuses on the removal of micropollutants in the tertiary treatment stage, which is equipped with tertiary treatment (T3). The removal of micropollutants is compared to the removal of conventional pollutants (COD, BOD, NH<sub>4</sub>-N, PO<sub>4</sub>-P, and SS). The results show that the removal of micropollutants is significantly higher than the removal of conventional pollutants. The study also discusses the impact of micropollutants on the environment and the need for design and monitoring decisions for the tertiary treatment stage.

**Title: Voluntary Groundwater Watch List Concept & Methodology 12.3**

Activity leaders and authors: Ronald Kozel (Swiss Federal Office for the Environment - CH), Rüdiger Water (Government Agency - DE) and members of the group of volunteers

The SCO is invited to take note of this report agreed by CIS Working Group on Groundwater.

**Background:**

The CIS Work Programme 2016-2018 includes the WG Groundwater (WG) activity 'Groundwater Watch List (GWWL)', with the objective of developing a methodology for identifying substances to be included in a GWWL.

WG GW agreed on the terms of reference for this activity at the end of 2016.

The Groundwater Directive (GWD) specifies the aim and the measures to protect groundwater. In Annexes I and II of the GWD detailed methodologies are defined to assess the chemical status of groundwater resources. Annex I establishes a list of groundwater quality standards and Annex II defines the need to establish threshold values for additional substances. During the first revision of the GWD in 2014 the European Commission expressed the need to obtain more information on further substances posing a potential risk for groundwater. To support this, the Commission decided to establish a watch list for pollutants of groundwater. The watch list should facilitate the identification of substances, including emerging pollutants, for which groundwater quality standards or threshold values should be set. The CIS Working Group on Groundwater (WG GW) was mandated to elaborate a concept for the establishment of this Groundwater Watch List (GWWL). In addition, criteria were defined to identify substances with sufficient high-quality monitoring data at EU level, being thus eligible for a further assessment in the context of the review of Annex I and II of the GWD.

This Read draft version was circulated within the group of volunteers and presented and discussed at the WG GW Plenary Meeting 2/9 October 2018. An additional final period to comment the report was provided prior to the SCO.

Working Group Groundwater  
Co-chairs: Elisa Vargas Amelín (DG ENV, COM, Elisa.VARGAS.AMELIN@ec.europa.eu), Thomas Kozel (Water-Information-System-Unit, T.Kozel@umwelt.ch), Rüdiger Water (Government Agency-DE, Rüdiger.Water@umwelt.de)

Volunteers for the group: NL, BE, IT, DE, CH, UK, FR, AT, CONSWA, ECHA, CEREC

**CLAIRE technical bulletin**

CLAIRE technical bulletin describe specific techniques, practices and methodologies currently being employed in the US, UK. This bulletin provides a survey of per- and polyfluoroalkyl substances (PFAS) and highlights approaches to manage risks and liabilities associated with their impact to the environment.

**Commentary**

**Persistent, mobile and toxic substances in the environment: a spotlight on current research and regulatory activities**

Hans Rüdel\*, Wolfgang Körner\*, Thomas Löffel\*, Michael Neumann\*, Karsten Nöcker\* and Thorsten Reimann\*

**Abstract:** Carbon perfluoro and other substances pose a hazard to drinking water resources. To foster the knowledge exchange on this topic the Working Group Environmental Monitoring of the German Chemical Society (VCI) and the Environmental Chemistry and Technology Association (VTE) have published a technical bulletin on the occurrence, behavior and removal of persistent, mobile and toxic, fluorinated (PFAS) substances in the environment. Current contributions highlight the most relevant substances such as perfluorinated alcohols (PFAS), perfluorinated carboxylic acids (PFCA) and perfluorinated sulfonates (PFSA). The bulletin provides an overview of the current state of knowledge on the occurrence, behavior and removal of these substances in the environment. The bulletin also highlights the need for further research and regulatory activities.

**Keywords:** Persistent, Mobile, Toxic Water Resources, Drinking Water, Risk Assessment, REACH Regulation, Peer-Comments, Non-target analysis.

**Managing Risks and Liabilities associated with Per- and Polyfluoroalkyl Substances (PFAS)**

This bulletin provides a survey of per- and polyfluoroalkyl substances (PFAS) and highlights approaches to manage risks and liabilities associated with their impact to the environment.

**1. SETTING THE SCENE**

The carbon fluorine bond is the strongest in organic chemistry and is highly resistant to chemical, thermal and biological degradation. This makes PFAS highly persistent in the environment. PFAS are a class of synthetic chemicals that are used in a wide range of consumer products and are found in many environmental compartments. PFAS are a class of synthetic chemicals that are used in a wide range of consumer products and are found in many environmental compartments. PFAS are a class of synthetic chemicals that are used in a wide range of consumer products and are found in many environmental compartments.

**2. PFAS IN THE ENVIRONMENT**

PFAS have been used since the 1940s as a wide range of applications. They are used in a wide range of consumer products and are found in many environmental compartments. PFAS are a class of synthetic chemicals that are used in a wide range of consumer products and are found in many environmental compartments.

**3. RISK ASSESSMENT**

Risk assessment is a process of identifying, evaluating and characterizing the risks associated with the exposure to PFAS. It involves the identification of the sources of exposure, the pathways of exposure, and the potential effects of exposure. Risk assessment is a process of identifying, evaluating and characterizing the risks associated with the exposure to PFAS.

**4. RISK MANAGEMENT**

Risk management is a process of identifying, evaluating and characterizing the risks associated with the exposure to PFAS. It involves the identification of the sources of exposure, the pathways of exposure, and the potential effects of exposure. Risk management is a process of identifying, evaluating and characterizing the risks associated with the exposure to PFAS.

**Steiger 9**

**Persistent Bioaccumulerend Toxisch Mobiel**

Wenselijk of noodzakelijk?

Jan Wijngaert  
Directie Omgevingsveiligheid en Milieuschics

**unesco**

**MANAGING AQUIFER RECHARGE**

A Showcase for Resilience and Sustainability

# Recommended organisations, businesses, or researchers to gather further information on these topics

---

ALGA	Eau de Paris	<b>INRAE</b>	RIWA Maas
ATSDR	ECHA	IRSA CNR	SDEA
AQUAREF	EEA	ITRC	Sednet
BRGM	EPA	JRC	SFSE
CEREGE	EU Directive WGs	KWR	Soilver
Common Forum	FNCCR	NICOLE	SURF
DND Biotech	French Water Agencies	OFB	UK Environmental Agency
Dutch Ministry of water management	<b>Horizon 2020</b>	<b>RIVM</b>	Université Gustave Eiffel
Eau de Paris	INOGEN		Water Sanitation from Africa

*Names in bold were the most cited*



# Many thanks to all the 80 online survey participants!

Contact:  
PROMISCES - [promiscses\\_sec@brgm.fr](mailto:promiscses_sec@brgm.fr)

<https://www.linkedin.com/company/promiscses/>  
[www.promiscses.eu](http://www.promiscses.eu)

