

Disclaimer: This document does not present a draft of the Green Deal call to be part of the Horizon 2020 work programme update, nor any future position of the European Commission. It aims to support the development of the call and its content is subject to change.

Title: Innovative, systemic zero-pollution solutions to protect health, environment and natural resources from persistent and mobile chemicals

Challenge:

A recent Eurobarometer survey (2020) showed that a large majority of respondents are worried about the impact on their health of chemicals present in everyday products. The European Green Deal includes a commitment to a zero-pollution ambition for a toxic-free environment. In this context, it specifically mentions the need to rapidly address the risks posed by hazardous chemicals and, more specifically, very persistent chemicals.

Pollution from persistent and mobile chemicals is often a systemic problem, as it is driven by factors closely related to the prevailing ways of production and consumption and is reinforced by missing appropriate technical solutions, including (bio)remediation and monitoring techniques for the environment (including the marine environment). These chemicals also pose challenges for regulatory authorities to develop or enforce effective policies.

An example of these chemicals is per- and polyfluoroalkyl substances (PFAS), a group of thousands of manmade chemicals that are widely used in various consumer and industrial products (e.g. water- and stain repellent textiles, fire-fighting foams, food contact materials and cosmetics) and to which citizens are exposed. They are an increasing concern as they are persistent in the environment, very mobile, toxic and can bioaccumulate. For these reasons, they are found everywhere in the environment and their concentration will increase over time, creating additional risks for human health and ecosystems. There are examples of contamination from PFAS of water and soil in most EU countries, which are costly to remediate.

The overall costs to society are estimated to be € 52-84bn across Europe, which is likely to be an underestimate, as it includes only a limited range of health effects (high cholesterol, impaired immune system, and cancer). Some studies have shown negative effects of PFAS on the immune system, including a reduced response to vaccines. This is of concern considering the current COVID-19 pandemic.

Scope:

This call topic aims at demonstrating innovative solutions to protect health, environment and natural resources from persistent and mobile chemicals, such as PFAS. Selected projects are expected to advance our knowledge on health impacts and environmental effects and to address a specific pollution problem of contamination of environmental resources (such as soil and drinking water). The solutions should lead to cost-effective mitigation or elimination of the issues (e.g. mitigation or remediation efforts in particularly affected geographic areas), and prevent and better understand negative impacts of the persistent and mobile chemicals on humans and the environment throughout their entire lifecycle. The projects may include appropriate technologies, business, governance and social innovation aspects and cover all innovation deployment phases up to the realisation of innovative solutions in the real life conditions (the first market applications, TRL 7-8). In particular, projects may consider analytical methods, enabling to quantify entire groups of persistent and mobile chemicals such as all PFAS in food or drinking water. This would allow achieving a higher level of consumer protection than regulating individual substances, as such 'group' methods are essential for enforcement of the entire group of harmful substances.

The successful projects shall include elements, such as research and development of (bio)remediation technologies of contaminated soil and water for persistent and mobile substances, including sources of drinking water for persistent and mobile chemicals; development of new cost-effective high-resolution methods to measure and separate persistent and mobile chemicals in different media; environmental and human (bio)monitoring¹ of persistent and mobile chemicals; gathering of toxicity and toxico-kinetic information in order to allow characterising all risks to human health, arising from the exposure to the entire group of

¹ All exposure data resulting from the projects data shall be shared via Information Platform for Chemical Monitoring IPCHEM (<https://ipchem.jrc.ec.europa.eu/RDSIdiscovery/ipchem/index.html>). Procedures and the network of reference laboratories established by HBM4EU (<https://www.hbm4eu.eu>) should be used.

these substances, including effects on the immune system; development of best practices for the management of waste containing persistent and mobile substances; and detection and identification of specific pollution problems. Proposed solutions should be cost-effective and easily implementable to encourage their uptake. Therefore, close consultation with potential end-users during the project life-time is recommended.

Expected impact:

- Better understanding of emerging and a persistent pollution problem of human and environmental health relevance
- Support the aims of the new [Circular Economy Action Plan](#) calling for methodologies to minimise the presence of substances that pose problems to health or the environment in recycled materials
- Solutions for better (bio)remediation and detection technologies, including real time monitoring approaches
- Improved risk assessment to facilitate optimal risk management
- Harmonisation of hazard and exposure data and databases
- Data of regulatory relevance accessible to policy makers and for risk communication

Research and innovation action