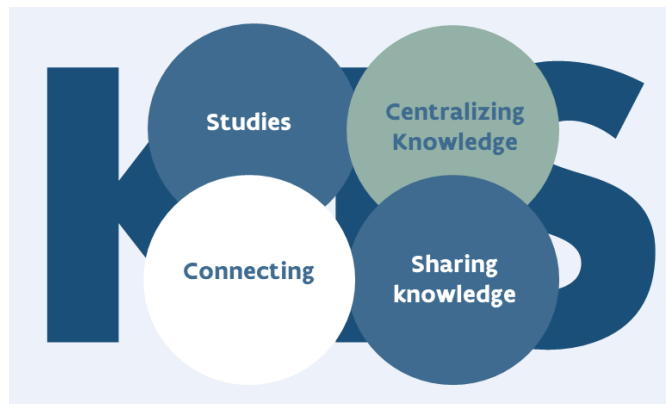


A joint effort of KIS vzw members:

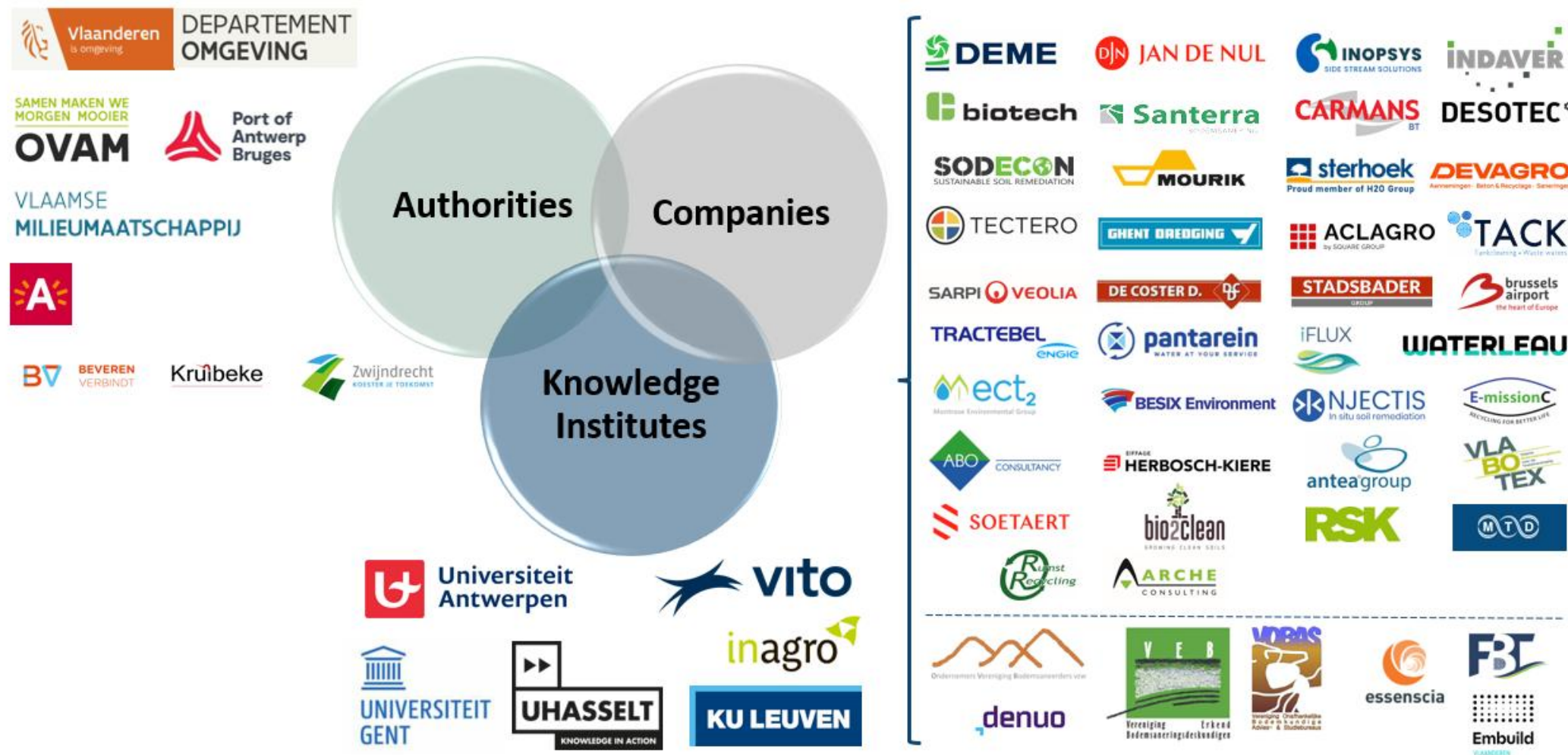
## Demonstration of Remediation technologies for PFAS via KIS-projects

Leen Bastiaens, Manager KIS vzw

ENSOR conference – Brussels, Belgium  
October 13-14<sup>th</sup>, 2025



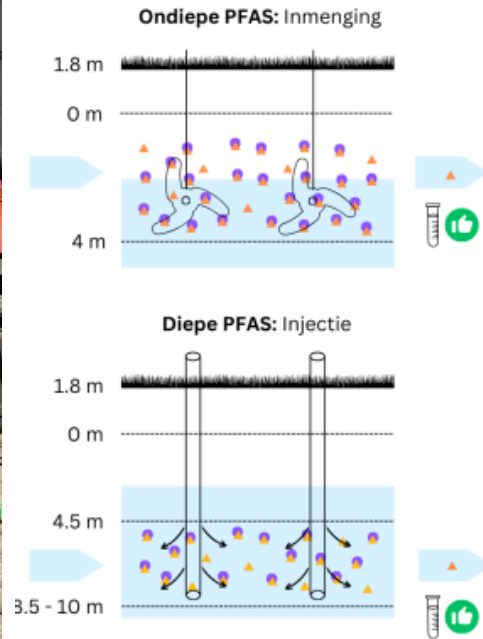
## Acceleration & innovation in solutions for substances of concern (like PFAS) in soil, water & air



# PFAS: 9 KIS-projects (icw OVAM)

Call	Acronym (start)	Title Project	Technology	Consortium partners
2023	PLANTS (11/2024)	Safeguarding Soil with Plants: exploring phytoremediation for PFAS cleanup (lager TRL)	Phytoremediation (with additives)	UAntwerpen & UHasselt
1 <sup>st</sup> call: CIST-2024-I	INSERT (12/2024)	Integration of social and ecological criteria for restoration of PFAS-contamination (transversal project)	-	UAntwerpen; ABO NV; VITO
	P-FRESCO (12/2024)	Plasma and Foaming-based Remediation with Enhanced Chemical Screening for PFAS (groundwater)	Concentration via foams + destruction with non-thermal plasma (NTP)	Jan de Nul (ENVISAN); Tectero; VITO; VOPAK Energy Park Antwerp
	PIGGS (12/2024)	PFAS-Immobilisation for soil voor groundwater remediation (soil)	In-situ Immobilization in source zone	Jan de Nul (ENVISAN); Soetaart; UGent; Antea Group; Port of Antwerp-Bruges
	HEMP4PFAS (12/2024)	Phytoremediation with industrial hemp as innovative mild remediation (soil)	Phytoremediation (with additives) linked to an economic valorization model	C-Biotech; Antea Belgium; DEME Environmental; E-missionC; iFlux; INAGRO; VITO
	InSuFix (12/2024)	Evaluation of the feasibility of in-situ stabilization of PFAS by injection of surface modified clay (soil)	In-situ Immobilization in source zone	Sodecon NV; VITO; Injectis NV; Brussels Airport Company; Port of Antwerp Bruges
	MembRix (12/2024)	Development and demonstration of a combined process based on regenerable ion exchange and membrane technology for removal of PFAS from wastewater of the industrial cleaning sector. (wastewater)	Nanofiltration + regenerable resins	Montrose Environmental Group; VITO; Federatie v/d Belgische textielverzorging
	IPS@TACK (11/2024)	Innovative PFAS remediation @ TACK (wastewater)	Concentration via membrane + destruction with non-thermal plasma (NTP)	Truck- en Tankcleaning Tack; Pantarein; Tectero BV; Vlaamse Milieumaatschappij (VMM); VITO
2 <sup>nd</sup> call: CIST-2024-II	INJANT (7/2025)	Feasibility of in-situ immobilisation of PFAS by injection of surface modified clay in a traditional VOCl-pluim treated by carbonsource injection (soil & grondwater)	Sorption + impact VOCl remediation	Antea, Sodecon, Injectis, KULeuven

# In-situ immobilisation of PFAS in soil



Reducing mobility

- To avoid dilution
- To protect groundwater

Alternative for excavation

Points of attention:

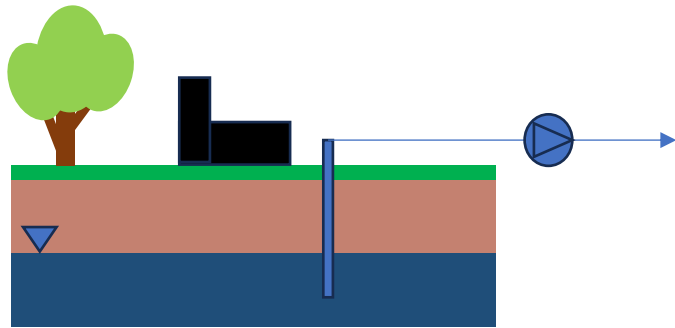
- Distribution in the subsurface
- PFAS remains in the soil → Long-term effects !

## Injection of sorbents:

- PIGGS – new sorbents
- InSuFix – surface modified clay (Fluorosorb)
- INJANT – surface modified clay (Fluorosorb) – impact of VOCL-remediation (carbon-source injection) in the same spot



# Groundwater treatment



**Step 1: pumping  
groundwater with PFAS**



**Step 2: Foam fractionation**

Aim: concentration of PFAS

Point of attention:

- emission to air?



Ionization of gases

**Step 3: Non-thermal Plasma**

Aim: destruction of PFAS

Points of attention:

- Metabolites formed?
- Complete destruction

P-FRESCO – lab & pilot demonstration

# Uptake of PFAS by plants



- PLANTS – lower TRL research with different plants & soil types
- HEMP4PFAS – Hemp (+ additives) & valorisation model (via e.a. biochar)



What is possible with plants?

Which PFAS molecules?

- Potential of Phytoremediation?
- Impact on maintenance of green areas?
- Restrictions & options for use PFAS-containing agricultural land?

Lab & Field demonstrations

Alternative for excavation

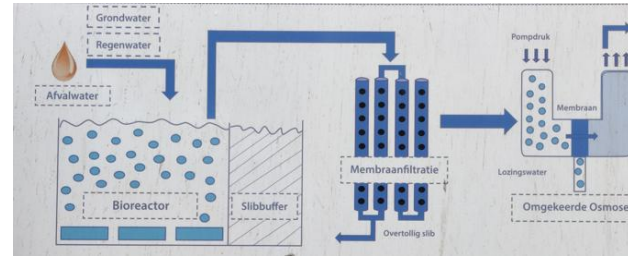
Points of attention:

- Mass balance!
- Fate of PFAS
- Maintenance (for 10-20 years?)
- ...

# Wastewater treatment

- **Membrix:**

Textile –  
industrial  
laundry



Nanofiltration  
reversed osmosis



**Step 2: Regenerable ion exchange resins**  
Aim: sorption (= further concentration)

- **IPS@TACK:**

Tank  
cleaning



**Step 1: Membrane technology**

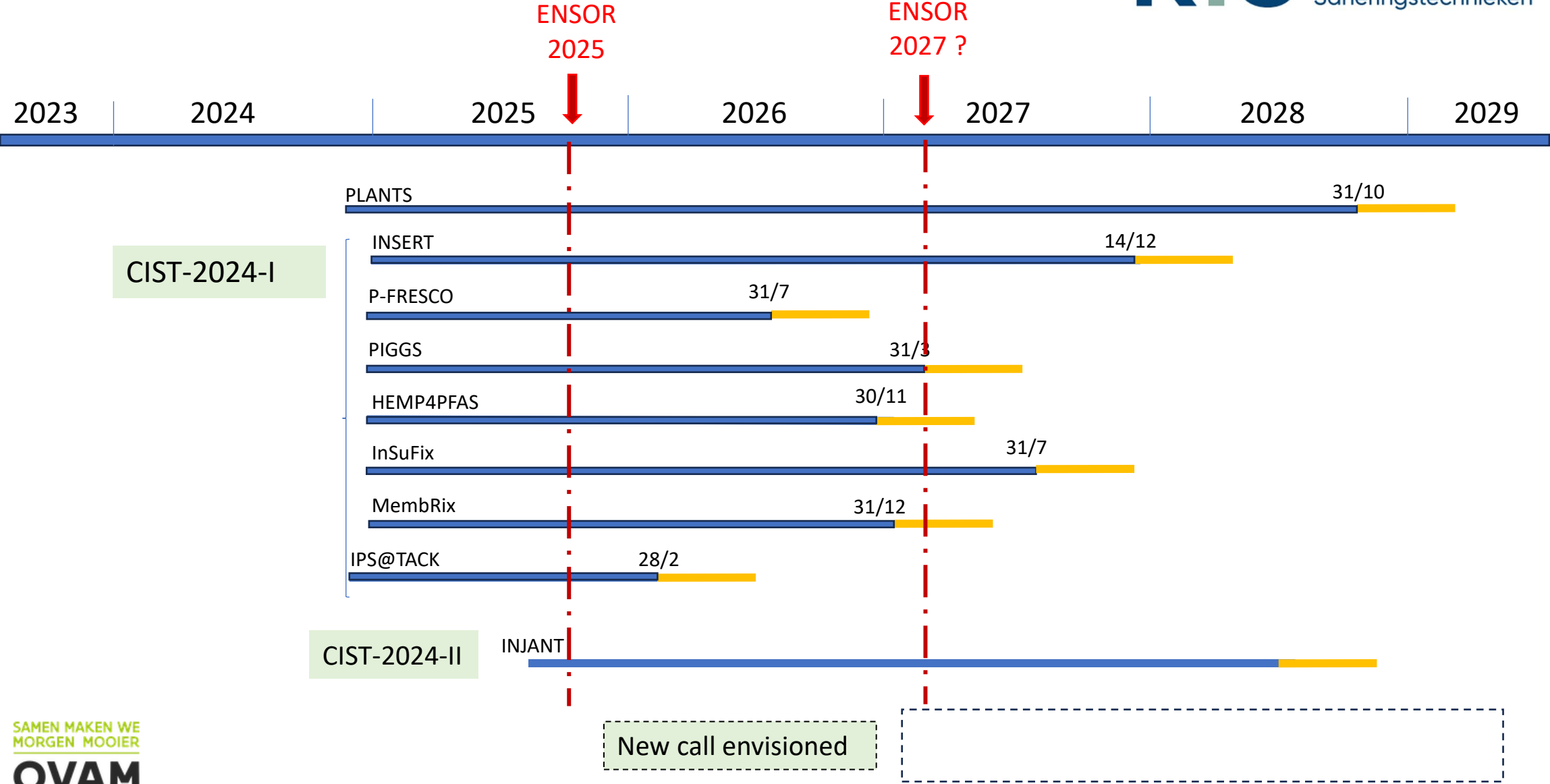
Aim: concentration of PFAS  
(removal of salts)



Ionization of gases

**Step 3: Non-thermal Plasma**  
Aim: destruction of PFAS

# Timeline





# Take home messages



The image displays the search filters and project cards on the KIS Projectendatabank website. On the left, there is a sidebar with filters for Status (Legend, Opstartend), Locatie (België), Type (Europees, Regionaal - Vlaams), and Type zorgwekkende stof (Andere zorgwekkende stoffen, Co-pollutanten, BITX, Minerale olie, VOCs, PFAS, FASA, C4-PFBSA, C6-PFHSA, C8-PFOSA, FTSA, C10-S2-FTTSA, C8-S2-FTSA, PFCA, C12-PFDoA, C14-PFTeOA, C4-PFBA, C5-PFPeA, C6-PFHSA, C7-PFHSA, C8-PFOA, C9-PFNA, PFSA, C4-PFBS, C5-PFPeS, C6-PFHs, C7-PFHs, C8-PFOS). Below these are filters for TECHNOLOGIE (Bioremediatie, Chemische destructie, Fytoremediatie, In-situ immobilisatie, Membraanfiltratie, Niet-thermisch plasma, Pyrolyse, Regenerereerbare ionenuitwisseling, Schuifinfiltratie, Sorptie, Thermische destructie, Transversaal) and Milieucompartmenten (Afvalwater, Bodem, Grondwater, Oppervlaktewater, Sediment, Transversaal, Water). The Type activiteit filter includes Labotesten, Sociale aspecten, Techno-economische aspecten, Technologie pilot, and Theoretische evaluatie. On the right, there are six project cards, each with a title, a brief description, and a 'Bekijk meer info' link. The projects are: 1. Gebiedsgerichte en natuurgebaseerde aanpak van PFAS-verontreiniging in Vlaanderen (LIFE PFASER), 2. In-situ immobilisatie van PFAS door injectie van organoklei in een traditioneel behandelde VOC-pluim (INJANT), 3. Fytoremediatie met industriële hennep als innovatieve saneringstechniek voor mild verontreinigde PFAS-gronden (HEMP4PFAS), 4. Regenerereerbare ionenuitwisselings- en membraantechnologie voor verwijdering van PFAS uit afvalwater van industriële wasserijen (MemBrix), 5. Integratie van sociale en ecologische criteria voor het herstellen van PFAS-vervuilingen (INSEST), and 6. Onderzoek naar de haalbaarheid van in-situ stabilisatie van PFAS door injectie van oppervlaktegemodificeerde klei (InSoFix).

Good to know about KIS-projects:

- Collaborations - multidisciplinary
- TRL5-6 (4-7) - demonstrations
- Wide range of PFAS considered:
  - Long/short chains
  - Ultra short chains
  - Precursors
  - Non target compounds

Follow rapid  
evolution

- Dissemination!
  - [KIS database of projects](#)

KIS vzw

Stationsstraat 110, 2800 Mechelen, België

E-mail: [info@kis.vlaanderen.be](mailto:info@kis.vlaanderen.be)

Website: [kis.vlaanderen.be](http://kis.vlaanderen.be)

1001.054.054

RPR Antwerpen (afdeling Mechelen)