Expected impact

The major impact of REGROUND will be a conceptual change in the ways we use to counter the threat of toxic metals in our drinking water supplies today.

Instead of using high-profile, *ex situ* equipment, the smart, ecoinnovative application of the REGROUND nanogeotechnology will make high technology available for the low-cost market.

REGROUND is not only a better technology. We open new opportunities to remediate many sites which could not be treated so far due to high costs and lack of an appropriate *in situ* technology.

1. Sustained clean water availability
   REGROUND will globally transform the efforts to mitigate the risks posed by toxic metal contaminations to humans and ecosystem.

2. Economic value and eco-innovation
   The final outcomes of the Reground Project will be submitted to an Environmental Technologies Verification (ETV) scheme in order to increase market uptake opportunities as well as to ensure sustainability of the developed technology.

Partners

1. Universität Duisburg Essen
   www.uni-due.de

2. Politecnico di Torino
   Dipartimento di Ingegneria dell’Ambiente, del Territorio e delle Infrastrutture
   www.diat.polito.it

3. Katholieke Universiteit Leuven
   Division of Soil and Water Management
   ees.kuleuven.be/web

4. Friedrich Schiller University Jena (FSU Jena)
   Institute of Geoscience
   www.igw.uni-jena.de/start.html

5. TECNALIA
   Soil contamination team/Area of Infrastructures

6. GEOPLANO
   www.geoplan.com

7. LEITAT
   www.leitat.org

8. Knowledge Innovation Market (KIM)
   www.kimglobal.com

reground-project.eu

Colloidal Iron Oxide Nanoparticles for the REclamation of Toxic Metal Contaminated GROUNDwater Aquifers, Drinking Water Wells, and River Bank Filtrations

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Overview

REGROUND – Colloidal Iron Oxide Nanoparticles for the REclamation of Toxic Metal Contaminated GROUNDwater Aquifers, Drinking Water Wells, and River Bank Filtrations - is a EU funded Project that aims to develop a first application and near-market application of a novel water nanogeotechnology for the immobilization of toxic metals in groundwater, in drinking water wells, and in river bank filtration sites.

Objectives

1. Optimization of technology for robust field application
   To be applicable at a wide range of sites, our iron oxide nanoparticle properties will be optimized in terms of subsurface mobility, adsorption capacity, and long term stability.

2. Establishment of standardized application protocols
   To be applicable for any given field site, a set of standardized, fast, and reproducible optimization protocols will be established.

3. Operation of two large scale field applications
   We will conduct industry scale applications at two different types of field sites, demonstrating control of the technology at real by field and the long term success of the REGROUND approach.

4. Market Implementation
   The final objective of REGROUND will be the market implementation of our technology.

The basic concept of our technology is the creation of an adsorptive in situ barrier for the immobilization of toxic metal contamination in groundwater.

This barrier is made of iron oxide nanoparticles, which are injected into sediments as colloidal suspension.

After injection, the nanoparticles form stable deposits within the aquifer, like a filter, through which the contaminated groundwater then runs. During the passage, the metals are adsorbed and thereby immobilized.

The downstream groundwater is then clean. No larger surface operations are needed; it’s safe, and significantly cheaper than conventional technologies.