

Metals/Construction materials

DBU-Funding information – Funding subject 8



Funding subject 8 – Recirculation and efficient use of environmentally-critical metals and mineral residual waste

The extraction of raw materials often goes hand in hand with serious environmental impacts. It is often difficult to recycle these materials because they are combined with such a vast array of other materials in a wide range of consumer goods. For this reason, in order to achieve a sustainable economy, efficient use and strict life-cycle management is essential for raw materials that are difficult to substitute. This applies especially to environmentally hazardous substances such as certain metals that are required for high-tech and environmental technology, as

well as phosphorous, which is crucial for ensuring food security for a growing global population. For this reason, the recirculation of – in particular – platinum group metals, indium, cobalt and rare earth metals must be reinforced.

Mineral residual waste represents one of the largest material flows in Germany. By recycling demolition waste, for example, on a technical level that is comparable to the primary product, we can keep these materials out of landfills and reduce primary raw material consumption.

In particular, the following measures are eligible:

- Educational concepts for promoting systemic thinking using the specified materials as examples
- Projects that reduce the use of environmentally critical metals and avoid dissipation of these materials, or projects in which environmentally critical metals are replaced by materials that can be extracted in an environmentally friendly manner
- Projects for recovery and treatment of environmentally critical metals and mineral residual waste
- Projects to increase the efficiency of the materials specified above in industrial and agricultural applications
- Development of measures for environmentally friendly use of materials that contain phosphorous (sewage sludge, organic waste, farm manure, etc.)
- Development of environmentally friendly phosphorous recovery and recycling procedures, possibly taking into consideration further nutrients (wastewater/sewage sludge, animal waste)
- Using the digitisation of manufacturing and information processes to promote sustainable use of environmentally critical metals and mineral residual waste
- Action-oriented projects for children and young people to communicate correlations to them and increase awareness of the materials specified

DBU-funding – competent and service-oriented

The Deutsche Bundesstiftung Umwelt (DBU) can look back on more than 25 years of funding. The foundation has a broad wealth of experience and professional expertise in various fields. In its work, the DBU can rely on a broad network of experts working as honorary consultants.

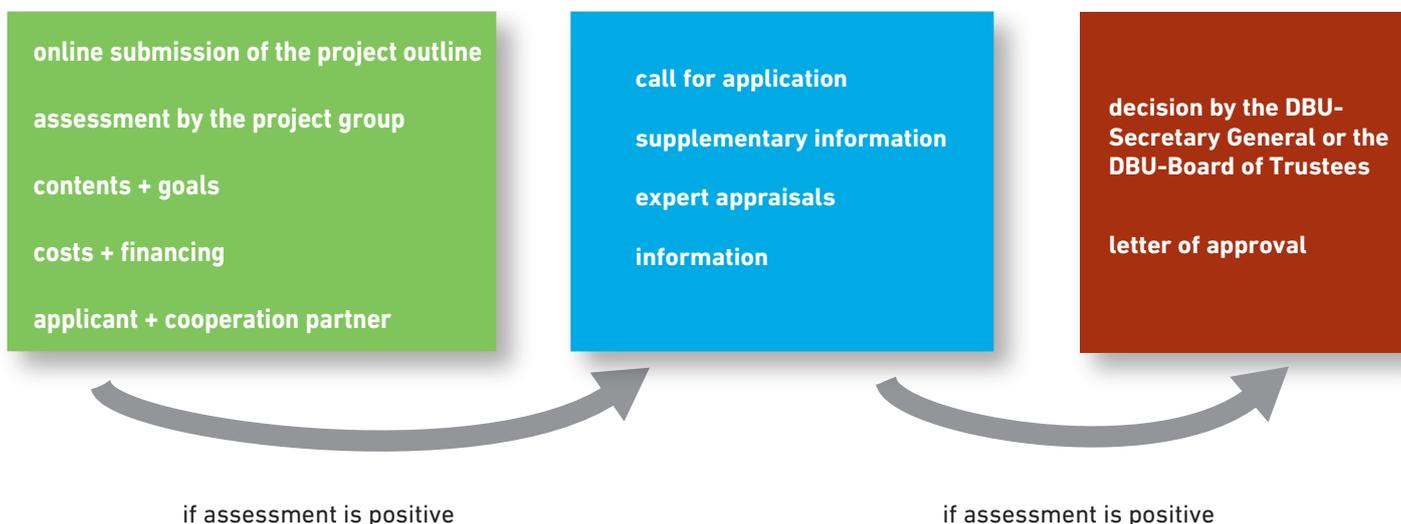
The DBU is independent and neutral from any political party. When submitting an application, only the technical quality and the innovative content of the application are important. The DBU offers its applicants competent, result-oriented advice and individual support by a highly qualified, interdisciplinary team. The internal

assessment of the projects and the external evaluation lead to a further development and qualification of the project proposal.

The DBU accompanies project partners from the project outline to implementation and provides support in finance and expertise.

DBU-partners of particularly successful projects are also supported in the dissemination of their project results by appropriate communication measures (trade fairs, exhibitions, events, publications, press work).

From outline to funding



First steps in a project outline

The DBU is interested in receiving innovative, exemplary project outlines that contribute to the recycling and efficient use of phosphorus and environmentally-critical metals.

Initially, it must be clarified:

- Does the project idea fit the support subject?
- Does the project idea involve at least one or more solution approaches?

If this is the case, the following criteria must be considered when developing a project outline:

- The problem addressed is a topic of supra-regional significance.
- The project produces the expectation of a concrete contribution to the solution for the problem described.

- The solution approach is developed and tested in practice and is examined for strengths and weaknesses.
- The solution approach can be multiplied and the proposed measures and methods are particularly promising for this aspect.
- The special unique selling point of the project in terms of technical significance and/or innovation is named.

If these criteria apply, interdisciplinary and systemic project approaches are of particular importance to the DBU.

You can submit your detailed project outline online www.dbu.de/antragstellung

Exemplary DBU-funded projects

The following projects show an excerpt from the thematic range of funding subject 8 and specify the implementation in the fields of action mentioned on page 1. Further information on the projects can be found at www.dbu.de

Phosphorus recycling from sewage sludge (AZ 31590)

Approximately two million tons of dry matter from sewage sludge, containing about 60,000 tons of phosphorus, are produced in Germany every year. With the support of the DBU, Chemische Fabrik Budenheim KG of Budenheim has developed a process for separating phosphates from sewage sludge and recovering them. For this purpose, carbon dioxide is fed under increased pressure into the water-sludge mixture, is converted to carbonic acid, causes the pH value to sink and dissolves the phosphates contained in the sewage sludge. The phosphates are then recovered in the form of calcium phosphate. The aim is to recycle up to 50% of the phosphorus contained in the sewage sludge in this way. It is currently planned that the recovered phosphates should be used exclusively in agriculture. In planting trials carried out to date, the fertilizing effect of the recycled fertilizer has been categorized as comparable to conventional phosphate fertilizers. In this regard phosphate recycling is an efficient method of conserving the natural phosphate reserves.



Galvanic metalization without palladium (AZ 29737)

Metalized plastic components are almost ubiquitous: for example, as chrome-plated automotive components or in bathroom fittings. In order to refine polymers in an electroplating process with a metal layer, a thin, electrically conductive coating - usually copper or nickel - must first be applied. This requires palladium as a catalyst, an element of the platinum precious metals group, which can only be applied after various acid baths. The project partners ITW Automotive Products GmbH, Röttingen, and the Fraunhofer Institute for Silicate Research ISC, Würzburg, are currently testing an alternative to avoid this environmentally hazardous chemical pretreatment and to conserve the resource palladium: they want to coat polymers with an electrically conductive layer of inorganic-organic hybrid polymers (Ormocere®) that allows direct electroplating. They have already succeeded in achieving good adhesion for the Ormocere® layer on polyamide substrates and galvanically depositing a copper layer on it.

Old concrete from demolished buildings: recovery before disposal

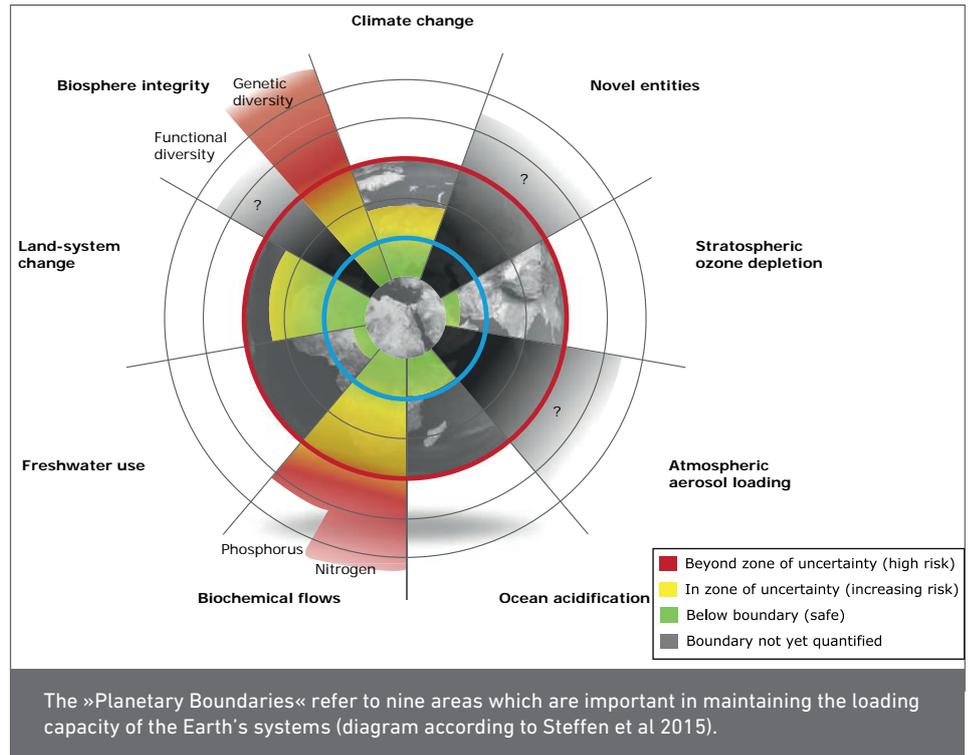
Conventional concrete production involves the extraction of gravel and crushed rocks, which in turn involves major interventions into natural ecosystems and the water balance. Using recycled concrete can help save natural resources (stones and gravel) and prevent environmental damage. For this reason, the DBU awarded two trailblazers in the area of concrete recycling with the German Environmental Award in 2016: Angelika Mettke from the Brandenburg Technical University (BTU) at Cottbus-Senftenberg, and Walter Feeß, CEO of Heinrich Feeß GmbH & Co. KG, Kirchheim/Teck. Mettke has established herself in Germany as a specialist for the possible uses of recycled concrete. Feeß established the basis for an innovative procedure in which used concrete is broken down to create what is referred to as recycled aggregate. He was the first person in Germany to receive official approval from the German Institute for Construction Technology for his recycled aggregate system.

Portrait: <https://www.youtube.com/watch?v=szm8w4M1bYs>



DBU – We promote innovations

The Deutsche Bundesstiftung Umwelt (DBU) supports innovative, exemplary and solution-oriented projects for the protection of the environment in accordance with the foundation's mission statement, with special consideration for the mid-sized business sphere. Funded projects should achieve sustainable effects in practice, provide impulses, and have a multiplier effect. It is important to the DBU to contribute, in particular, to solving current environmental problems which result from unsustainable economic practices and ways of life in our society. The DBU sees key challenges above all in climate change, biodiversity loss, the unsustainable use of resources, and harmful emissions. The funding subjects thus tie in with both current scientific findings on »planetary boundaries« and with the Sustainable Development Goals adopted by the UN. Especially with regard to biological diversity (biosphere integrity) and the disruption of the nutrient cycles of nitrogen and phosphorus (biochemical flows), the planetary boundaries have been far exceeded. Humanity has therefore moved a long way from any safe operating space, and is now exposed to a high risk of negative ecological, economic and social consequences. Mankind has also already moved into the danger zone in terms of land-system change and climate change.



Deutsche
Bundesstiftung Umwelt

Your contact for the funding subjects

Your project outlines are worked on in an interdisciplinary project group:

Dr. Maximilian Hempel (project group management)
phone +49541/9633-301, e-mail: m.hempel@dbu.de

Dr. Volker Berding
phone +49541/9633-311, e-mail: v.berding@dbu.de

Christiane Grimm
phone +49541/9633-343, e-mail: c.grimm@dbu.de

Franz-Peter Heidenreich
phone +49541/9633-231, e-mail: fp.heidenreich@dbu.de

Dr. Michael Schwake
phone +49541/9633-213, e-mail: m.schwake@dbu.de

Dr. Susanne Wiese-Willmaring
phone +49541/9633-343, e-mail: s.wiese-willmaring@dbu.de

Dr. Holger N. Wurl
phone +49541/9633-341, e-mail: hn.wurl@dbu.de

Further information is available at www.dbu.de

We promote innovations

Deutsche Bundesstiftung Umwelt
Postfach 1705, 49007 Osnabrück
An der Bornau 2, 49090 Osnabrück
phone +49541/9633-0
fax +49541/9633-190
www.dbu.de



Imprint

Publisher: Deutsche Bundesstiftung Umwelt (DBU), An der Bornau 2, 49090 Osnabrück, phone +49541/9633-0, fax +49541/9633-190, www.dbu.de // **Editor:** Verena Menz, Dr. Rainer Erb // **Responsible:** Prof. Dr. Markus Große Ophoff // **Design:** Helga Kuhn // **Photo credits:** p. 3 middle: © Smileus - Fotolia.com, all other photos: DBU