

Recovering phosphorus from sewage sludge in South Tyrol



What is the most ecologically and economically effective way of recovering phosphorus from sewage sludge? And what can be done at the same time ensure safe disposal? EBP helped the Environmental Protection Agency of the Autonomous Province of Bolzano to answer these questions.

The 44 wastewater treatment plants (WTPs) in the Autonomous Province of Bolzano account for nearly 13,000 tons (dry weight) of sewage sludge each year. The province's current approach to disposing of the sludge is comparatively costly, lacks environmental sustainability and meets with little acceptance among lawmakers and their constituents. In light of these deficiencies, the Environmental Protection Agency has been on the lookout for alternative solutions that would involve making greater use of the sewage sludge. One particular aim in this connection is to recover the phosphorus contained in the sludge so as to close the phosphorus cycle.

Alternative methods of phosphorus recovery

Various methods have been developed for recovering phosphorus from sewage sludge. These **methods** are calibrated to the different sources in the wastewater path and are based on various processing principles. Starting with three relatively advanced recovery technologies, we developed eight different promising methods of recovering phosphorus in South Tyrol, in each case working out the details from the moment of sludge accumulation at the wastewater treatment plants to the reuse of the recovered phosphorus product.

Client

Environmental Protection Agency of the
Autonomous Province of Bolzano

Facts

Period	2018 - 2024
Project Country	Italy
Wastewater treatment plants	44
Sewage sludge (dry weight)	12,745 tons
Phosphorus (powder)	400 tons

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Evaluation of the various methods

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In the interest of evaluating the eight methods, we worked together with the Environmental Protection Agency to develop and implement a catalogue of criteria that takes account of the needs of the individual WTPs. Altogether, we defined 16 criteria that were assigned to the following categories: environmental impact; economic impact; disposal safety; and public acceptance. We were then able to use these criteria as a basis for a comprehensive evaluation of the methods by which to repurpose sewage sludge in general and to recover phosphorus in particular.

In the framework of further investigations, our project team reexamined the selected methods in terms of their energy efficiency, carbon footprint and cost effectiveness.

A basis for further decision making

We compiled the results of our investigations so that they could be used as a basis for further decision making by the Environmental Protection Agency, the provincial government and other stakeholders. We also issued specific recommendations for an economically and ecologically sustainable approach to using sewage sludge and recovering phosphorus in a manner that would also ensure disposal safety.