

# INTRODUCING THE FP7 PROJECT TIMBRE: TAILORED IMPROVEMENT OF BROWNFIELD REGENERATION IN EUROPE

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## Abstract

Regeneration of large and complexly contaminated brownfields, so-called megasites, is essential for sustainable land management in Europe. Useful technologies for site clean-up as well as methods to support decision making exist in European developed countries, but they are rarely applied using their entire potential. It may be either the non-visibility of tools or actually an overflow of scattered information being the reasons that contaminated sites are not regenerated using best available technology, planning and decision support measures. The research project TIMBRE—co-funded by the European Union’s Seventh Framework Programme—is to support end-users in overcoming existing barriers by developing and providing customised problem- and target-oriented packages of technologies (e.g. direct push, tree core sampling, soil washing with recycled foams), approaches and management tools for the prioritisation, reuse planning and integrated assessment of large and complex contaminated sites. As a unique asset, TIMBRE does deliberately include cultural characteristics. This introduction to the TIMBRE project shall benefit all actors looking for state-of-the-art in contaminated sites management and regeneration.

## Introduction

In the last decades, economic restructuring has led to a growing number of brownfields—derelict or underused areas that have been affected by their former uses and require intervention to bring them back to beneficial use—in all industrialised countries. Major areas previously used for military, mining, industrial or commercial purposes are frequently beset by high levels of complex contamination. Regarded as being problematic, many impede the development of surrounding communities.

Brownfields regeneration is essential for sustainable land management in European Member States. In the course of the last decades, soil has been increasingly perceived and understood as a scarce and non-renewable resource, stressing the need for more efficient land management (cf. De Sousa 2008, Thornton et al. 2007). In 2006, almost 2.3% of the EU’s territory was actually sealed and each EU citizen was on average stocked with 200m<sup>2</sup> sealed soil (Prokop et al. 2011). In many European countries the attempt to considerably reduce land consumption and soil sealing, to avoid urban sprawl and similar developments has been implemented in political strategies (European Commission 2006, 2012a, b, European Ministers of Urban Development 2007).

However, restoration, revitalization and redevelopment of complexly contaminated or publicly debated sites is often hampered by real or perceived environmental contamination, high costs for cleaning up but also diverse interests of actors that are to take part in or are affected by the design and form of reuse (Bartke 2011, Bleicher and Groß 2010, Schädler et al. 2011). Since the 1980’s, methodologies and tools for the investigation of contaminants, strategies for risk assessment and cleaning up as well as tools for decision support have been developed. First, the focus was on abilities moving from ex situ to in situ techniques, hence, a variety of remediation technologies has been made available for

site remediation, but it was broadly understood that no single technology is fitting for all pollutants and the multiplicity of site-specific conditions present at different contaminated sites (Khan et al. 2004). In the late 1990s, the focus shifted to the development of decision support tools, initially to help in the effective choice and processing of remediation technologies. Moreover, the growing consciousness for a more sustainable land management raised the demands for integrated land revitalisation strategies. Numerous research projects and programs have been carried out, which aimed at developing strategies for sustainable brownfield development and remediation (Bleicher and Bartke 2012).

Hence, useful technologies for site clean-up as well as methods to support decision making exist in European developed countries, but they are rarely applied using their entire potential. It may be either the non-visibility of tools or actually an overflow of scattered information being the reasons that stakeholders do not redevelop contaminated sites using best available technology, planning and decision support measures. The research project TIMBRE—co-funded by the European Union's Seventh Framework Programme—is to support end-users in overcoming existing barriers by developing and providing customised problem- and target-oriented packages of technologies, approaches and management tools for the prioritisation, reuse planning and integrated assessment of large and complex contaminated sites. TIMBRE stands for "Tailored Improvement for Brownfield Regeneration in Europe", which is at a glance the objective of the project.

### **Materials and Methods: Challenges to megasite regeneration**

TIMBRE is concerned about brownfields in general and the so-called megasites in particular, i.e. major areas previously used for military, mining, industrial or commercial purposes that are frequently beset by high levels of complex contamination. In Europe, there are over 20,000 large and complex contaminated sites (cf. Bittens et al. 2008). These megasites threaten scarce soil and water resources and cause environmental and health risks as well as economic and social costs. Their effective and sustainable regeneration requires innovative investigation and remediation technologies and integrated evaluation approaches for re-use options (cf. Rügner et al. 2007, Schädler et al. 2011).

Megasites are characterised not only by their size, but also by their complexity of soil and groundwater contaminations, large residual above ground and underground buildings and a heterogeneous mix of stakeholder interests. Megasites pose difficult technical and social challenges for risk-management, policy issues and reuse. Consequently, several research projects on the EU level as well as with a regional and national focus have resulted in a lot of positive impacts at model sites and in model regions as well as awareness about major inputs towards successful brownfield development (among those projects we only want to mention WELCOME, CABERNET, PROSIDE, RESCUE, REVIT, COBRAMAN, SUBR:IM, SAFIRA II, DARTS, DESYRE, SYRIADE, Terrestrial Environment, EUGRIS, EURODEMO, HERACLES, INCORE, ISOIL, NICOLE, ModelPROBE, NORISC, Riskbase, SCAPE, SNOWMEN, PROMOTE, PURE ABC, REC or SoilCAM). These projects have produced a variety of products intended to exert a wider impact, but so far their institutional and practical impact has been limited. In particular, innovative technologies and methods developed to investigate and remove soil contaminations were broadly applied only in a few countries of the European Union.

The improvement of brownfield regeneration and in particular megasite revitalisation requires the understanding that currently, the success in brownfield regeneration is unsatisfying in terms of financial and eco-efficiency or social acceptance. Many useful and innovative technologies for site clean-up as well as methods to support decision making processes existing are only rarely applied to their full potential. An immense diversification of tools with little connection to each other as well as a lack of consideration of regional and cultural specificities deters end-users from application. Sometimes the non-visibility of tools is the reason that problem owners, managers, local authorities

and other stakeholders do not regenerate brownfields using the best technology available. Additionally, emerging challenges, such as the urgent demand for soil remediation and the reuse of on-site infrastructures, call for the development of new and integrated solutions.

Against this problem background, TIMBRE will provide a unique approach of best practise solutions for end-users that are involved in brownfield regeneration processes. For this purpose, an information platform will be developed based on information from successful brownfield regeneration projects throughout the European Union. This means, TIMBRE will focus on implemented instruments that have already stood the test of time as well as their social acceptance in real world cases through research in the context of its application. Finally, TIMBRE will contribute to fill existing knowledge gaps by developing innovative technological remedies together with tailored decision support tools to be publically available on the web based TIMBRE tool suite platform. Thereby, TIMBRE is to support the regeneration of megasites providing problem- and target-oriented approaches, technologies and tools for assessment, investigation, remediation and integrated planning offering a directed and comprehensive support for those interested in the regeneration of megasites.

## **Results and Objectives of TIMBRE**

As TIMBRE started just in 2011, this section just points to the objectives of the project. In a first step, TIMBRE screened recent projects and initiatives on the EU level to select and fathom approaches and technologies that are able to fill existing gaps. Improvement of existing means to support brownfield regeneration is further accomplished by filling methodological core topics such as intelligent site investigation strategies and multi-criteria assessment methods. This is done with innovative approaches and technologies as regards the integration of energy efficiency, in-situ remediation (e.g. phytoremediation, soil washing) as well as the re-use of existing materials and infrastructures.

The TIMBRE project envisages to develop technical tools of redevelopment and rehabilitation, but also to better understand the framework conditions of their application. TIMBRE is focusing on the spatial, social and political context not as residual categories to be taken into account later on but as a constitutive element of brownfield regeneration. On the regional level, TIMBRE develops cost effective and sustainable strategies for prioritising effective overall clean-up processes for contaminated areas. Technologies and management strategies are combined in a TIMBRE tool suite addressing diverse decisions that have to be made during the course of a regeneration project. These decisions range from the prioritisation of sites respecting social, economic and environmental impacts of their reuse to the detailed design and implementation of restoration, preparation and reuse activities. To bring all these novel instruments into fruition, TIMBRE will elaborate new dissemination strategies providing specific training measures and a unique information centre for end-users: the TIMBRE web platform.

## **Discussion**

For the moment, the discussion remains open to all actors concerned with brownfield regeneration in Europe and beyond. The project is intended to benefit a variety of experts and interested stakeholders involved in or affected by the planning, assessment and management of a megasite's revitalisation. The TIMBRE ambitions are high and the project's success not least will depend on the ability to attract these actors and stakeholders to participate in the elaboration of the TIMBRE products. Therefore, we invite you to follow and participate in the elaboration of the TIMBRE objectives and results. Visit our website at <http://www.timbre-project.eu> and learn more on how to get involved!

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