



# Science for Environment Policy

## Model offers insight into long-term costs and payoff of brownfield redevelopment

**It can take six to seven years** before the financial benefits of brownfield regeneration projects are realised, according to a new study which focused on redevelopment in Michigan, USA. The study examines liability issues, regulatory concerns, clean-up standards and funding mechanisms, and introduces a new model that informs debate on brownfield redevelopment policies and funding mechanisms

### Thematic Issue 39 Brownfield Regeneration

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**Source:** BenDor, T.K., Metcalf, S.S. and Paich, M. (2011) The Dynamics of Brownfield Redevelopment. *Sustainability* 3: 914-936. doi: 10.3390/su3060914. This study is free to view at: [www.mdpi.com/2071-1050/3/6/914](http://www.mdpi.com/2071-1050/3/6/914)

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**Brownfield redevelopment** is a sustainable [land use](#) strategy that helps address [urban sprawl](#) and promotes economic development, bolstering the public tax base through new job creation. Brownfield developers must negotiate site remediation, permits, liability, funding and economic viability. These issues are interlinked, which has led to experts requesting more dynamic brownfield redevelopment policy models to reflect their interrelatedness.

To help understand some of these dynamics, the study investigated brownfield redevelopment in Michigan, focusing on factors that affect how long it takes for a project's finances to eventually break even. The state of Michigan is considered a redevelopment leader thanks to its aggressive environmental clean-up efforts since the 1970s, spending more than \$830 million (circa €630 million) to decontaminate brownfield sites.

To calculate the delay between when expenditures are incurred on brownfield projects in Michigan, and when tax benefits eventually accrue from redevelopment, the researchers developed a new model using 'system dynamics'. This computer-aided approach to policy analysis and design can help decision makers understand the behaviour of complex systems over time. The model used data from the Department of Environmental Quality (MDEQ) and US Conference of Mayors brownfield surveys.

Once stakeholders have committed to a redevelopment project, its budget will often run in deficit. The model incorporates this project deficit, reflecting the real situation that Michigan (and other US states) has faced since introducing brownfield legislation in the mid-1990s.

Taking cumulative expenditures and tax revenues into account, and modelling projects with a range of annual funding levels, the study finds that, in Michigan, projects take six to seven years to break even.

The new model also explains how the benefits of brownfield redevelopment take time to accrue, and that they are often discounted relative to immediate costs. Governments typically aim to revitalise brownfields to the economic benefit of the community, yet they must also promote public health by enacting strict environmental regulations that increase liability risks for stakeholders interested in redeveloping a contaminated area.

These sometimes contradictory goals can slow down revitalisation in areas with questionable – i.e. less tangible short term – economic benefits. Brownfield sites with even small amounts of contaminants may still be extremely challenging to remediate.

