

DEVELOPMENT OF REGENERATIVE DESIGN PRINCIPLES FOR BUILDING RETROFITS

How can regenerative design concepts be implemented into building retrofits?

This research seeks to provide a set of regenerative design principles for building retrofits. This will help designers consider how a single building retrofit can add positive value to its surroundings.

The Need to Retrofit

- "In developed countries, the majority of buildings which will be standing in 2050 have already been built."

- Regenerative design concepts are starting to become established in frameworks such as the Living Building Challenge and One Planet Living, but the outcomes still seem to be new buildings or developments in unique and ideal conditions.

- We currently have the means and technology to achieve regenerative outcomes for building retrofits. A change of *mind* not techniques is required.

'Reactive' to 'Proactive' Retrofitting

The 'Levels of Work' framework is applied in this research to propose a 'reactive' and 'proactive' approach to retrofitting. The below-the-line

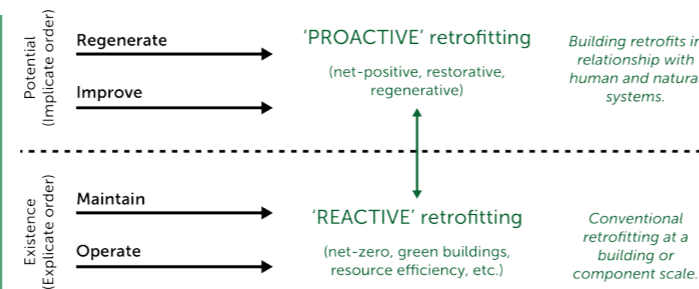


Figure 2: 'Proactive' and 'reactive' retrofitting

concepts of operating and maintaining deal only with what is in existence while the above-the-line concepts of improving and regenerating explore the creativity and potential in relationship to the larger system. Conventional approaches to building retrofits that are focused on efficiency and cost are simply 'reacting' to a negative event or circumstance, and are therefore below-the-line. A 'proactive' building retrofit seeks to integrate **net-positive, restorative** and **regenerative** concepts by considering the positive interactions with its surroundings. However, what is crucial to a system's ongoing health and capacity for evolution is its ability to work at all four levels. This means that reducing a building's 'negatives' is still crucial to the retrofit process, and in some cases can provide the foundation on which to expand positive interactions with its surrounding systems.

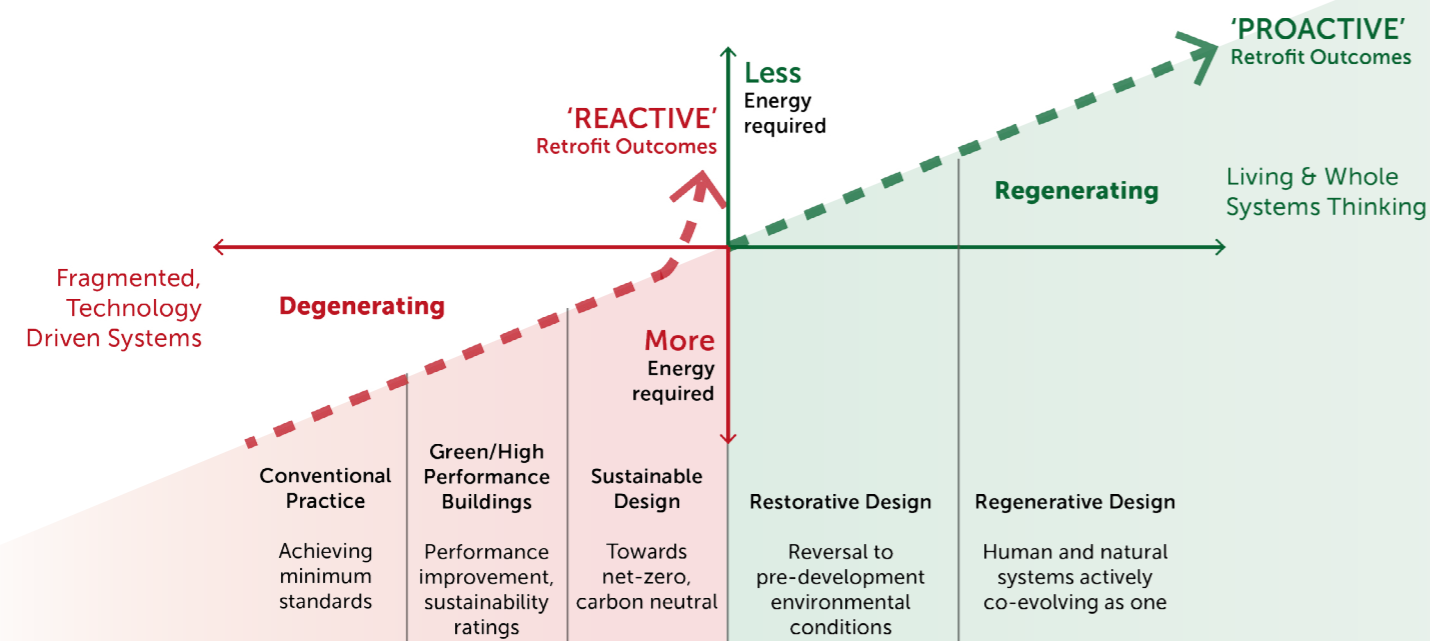


Figure 1: Range of sustainability approaches (after: Bill Reed, 2007)

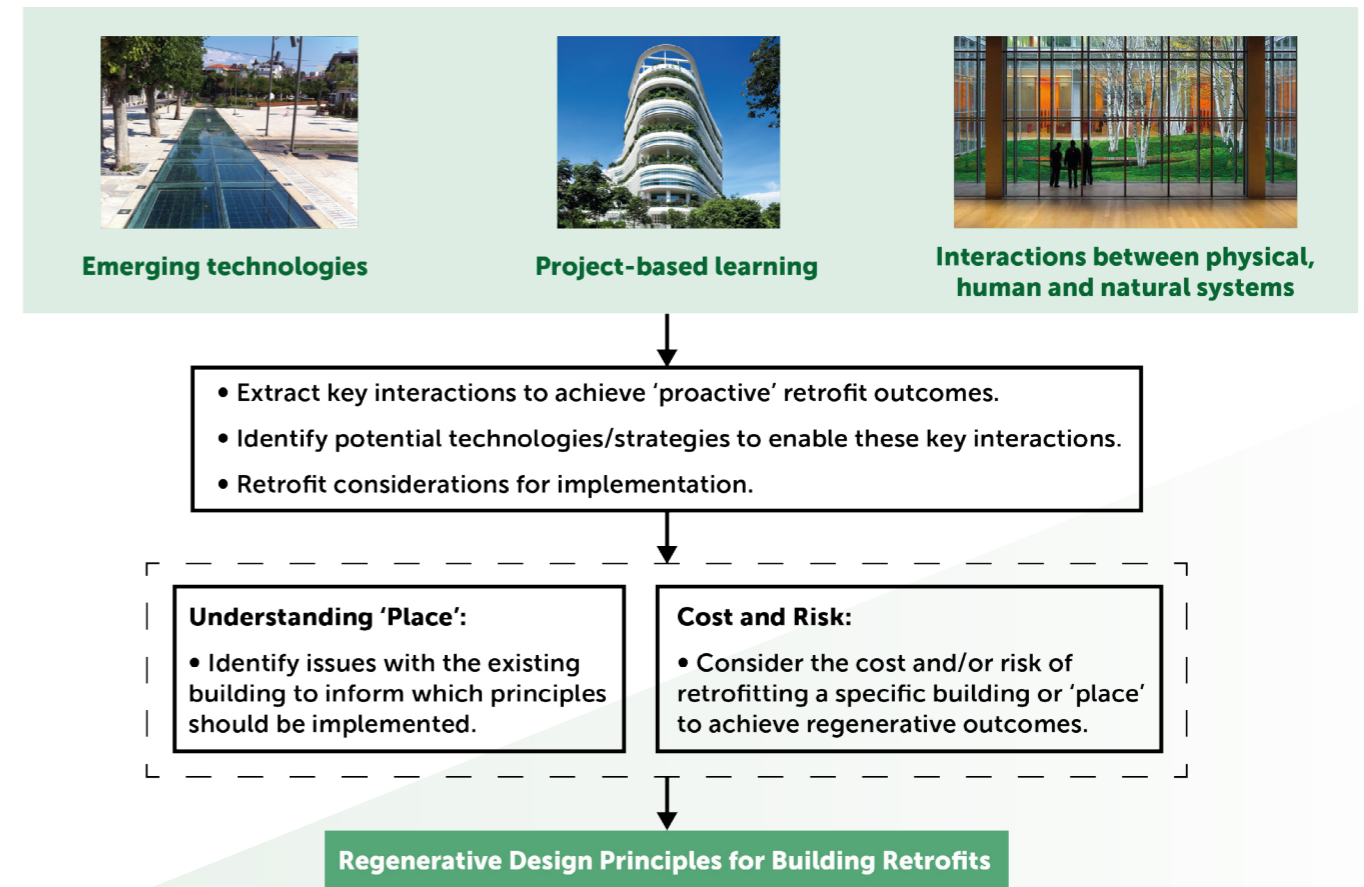


Figure 3: Development of regenerative design principles

Development of the Principles

The development of regenerative design principles for building retrofits is primarily enabled through exploring the **key interactions between physical, human and natural systems**. Integrating emerging technologies which address these key interactions will ensure these principles are innovative as well as feasible. The following are examples of regenerative design principles for building retrofits (currently under development):

- Retrofit to support human & natural co-habitation
- Building envelope to improve indoor environment & restore local ecosystems
- Positive energy exchange with surrounding built environment
- Retrofit for resilient buildings

Future Work

This research will continue to develop a set of regenerative design principles for building retrofits. Ultimately, these principles will provide high-level guidance to designers in order to expand rather than prescribe potential retrofit solutions. However, before these principles can be applied to a specific building, a deeper understanding of its 'place' as well as the people and technologies already present needs to be considered.

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