

## Sustainable facade constructions

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### Abstract

The building envelope has a significant contribution to the CO<sub>2</sub> footprint of a building. This applies to both new buildings and existing buildings. The life cycle of a building can be extended through intelligent façade renovation or renewal, which of course has a positive effect on the overall balance. The decisive factor is a holistic approach from planning, construction, operation and maintenance including refurbishment and deconstruction. Current developments in facade construction will be shown. It is not just a matter of finding the best heat transfer coefficient for a window, for example, but of finding intelligent, object-related solutions.

**Keywords:** facade; glass; sustainability; cradle to cradle.

### 1 Introduction

The climate change and rising energy costs have increased society's awareness of energy-saving measures. To reduce CO<sub>2</sub> emissions, many buildings from the 1960s and 1970s are now being refurbished. They barely meet the more stringent building standards introduced in recent years and often need to be renovated not only for energy efficiency, but also for fire safety and functionality. Retrofitting existing buildings is often very complex. New buildings also have to be planned and built in a way that conserves resources, are as climate-neutral as possible, and have a long service life.

### 2 Basics

Sustainability thinking in the construction sector still focuses only on minimizing the ecological footprint or reducing CO<sub>2</sub> emissions for heating or cooling. Extending the life cycle of a façade - whether through materials that meet changing

requirements for a long time or through revitalization of the structures - has a positive impact on sustainability. Cradle to Cradle aims to reinterpret the idea of sustainability in a positive way: A building should be designed in such a way that it not only causes less harm, but also adds value to people and the environment. Beyond building materials, this involves three "design principles": waste as a nutrient (resource conservation and continuous material cycles), use of renewable energy and promotion of cultural and biological diversity.

### 3 Types of facade

The construction of facades is very diverse. There are different types of facades, e.g. transom and mullion facades, element facades, double facades or simple perforated facades. All facades have transparent areas and opaque areas in common. Transparent areas are usually made of glass, opaque areas of thermally separated aluminium