

Sustainability: Materials & Circular Economy

Introduction

The materials used in any residential project have a critical impact on the health and wellbeing of occupants as well as on the environment. Giving careful consideration to the materials used in a project can result in positive outcomes for both people and the planet. Using materials that are natural, contain no or minimal harmful chemicals and that are reusable or recyclable should be prioritised.

How do materials impact health?

Materials, finishes, furnishings and other building products can have a significant impact on occupant's health due to the off-gassing of Volatile Organic Compounds (VOCs). VOCs are toxic substances which diminish the indoor air quality and have been linked with headaches, lethargy and respiratory problems such as asthma. With good ventilation VOCs will dissipate over time.

What are Healthy Materials?

Materials that have low or no VOC emissions will contribute to a healthy indoor environment. Low or no VOC paints are readily available for internal surfaces and low VOC options for cabinets and joinery are also possible. Use of natural materials such as timber, stone, natural clay bricks, straw and wool can also reduce levels of VOCs and contribute to an improved indoor air quality. Natural materials can also have environmental benefits if they are sustainably produced as they are often made from renewable resources, will have lower embodied energy, and can be easier to recycle or dispose of at end of life.

What is the Circular Economy?

We need natural resources to make items we use every day but we're using more than we can regenerate each year. This linear economy follows a 'take, make and waste' model that results in lost resources and lots of waste. But there is a better way.

In a circular economy all items are used for as long as possible then recycled for future use. The outcome is less waste, lower greenhouse gas emissions, fewer natural resources used, and increased potential for economic growth as well as employment opportunities.

Adaptive reuse of buildings within a circular economy framework prioritises resource efficiency and waste reduction by reusing existing materials and components, extending the lifespan of buildings, and promoting sustainable practices throughout the construction process.



Checklist & Key Considerations

- Have you sought advice about sustainable and healthy materials from a Sustainability Consultant?
- Are there materials within the existing building that can be reused in the project?
- If materials can't be reused can they be salvaged or recycled?
- Are proposed materials and finishes low VOC?
- Are proposed materials produced sustainably and ethically?
- Can materials be easily reused or recycled at the end of their life?

Adaptive reuse aligns with the circular economy in a number of ways including:

- **Resource Efficiency:** Instead of demolishing and rebuilding, adaptive reuse focuses on enhancing existing structures, reducing the need for new materials and energy
- **Material Reuse and Recycling:** Adaptive reuse projects can incorporate salvaged materials from other buildings or repurpose existing components, minimising waste and promoting resource recovery
- **Extended Lifespan of Buildings:** By improving building performance and durability through retrofits, the overall lifespan of buildings can be extended, reducing the need for premature demolition and replacement
- **Waste Reduction:** Retrofitting can help reduce construction waste by promoting the use of durable, recyclable, and reusable materials
- **Design for Disassembly:** Enable reuse of materials at the end of a building's life
- **Circular Supply Chains:** Adaptive reuse supports circular supply chains by prioritising refurbishment, reuse and recycling.

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Key principles to consider for adaptive reuse in a Circular Economy include:

- **Design for Deconstruction:** Buildings should be designed with the possibility of future deconstruction and reuse in mind, making it easier to dismantle and recover materials.
- **Reusing existing building materials:** Using salvaged bricks, timber, or metal cladding in new construction projects.
- **Recycling construction waste:** Transforming demolition waste into new aggregates for concrete or other construction materials.
- **Upgrading building systems:** Replacing old heating, ventilation, and air conditioning (HVAC) systems with energy-efficient alternatives.
- **Installing renewable energy systems:** Adding solar panels or other renewable energy technologies to existing buildings.
- **Improving building insulation:** Adding insulation to walls and roofs to reduce energy consumption.
- **Using sustainable building materials:** Opting for materials with low embodied carbon and high reusability or recyclability.
- **Designing for Deconstruction:** Using modular construction techniques or other methods that make it easier to dismantle and reuse components at the end of a building's life.

Getting the right advice

A Sustainability Consultant can provide detailed project specific advice on healthy and sustainable material options. Finding an Architect or Designer with experience in sustainable and healthy building materials will also assist in understanding the options and choices that are available.