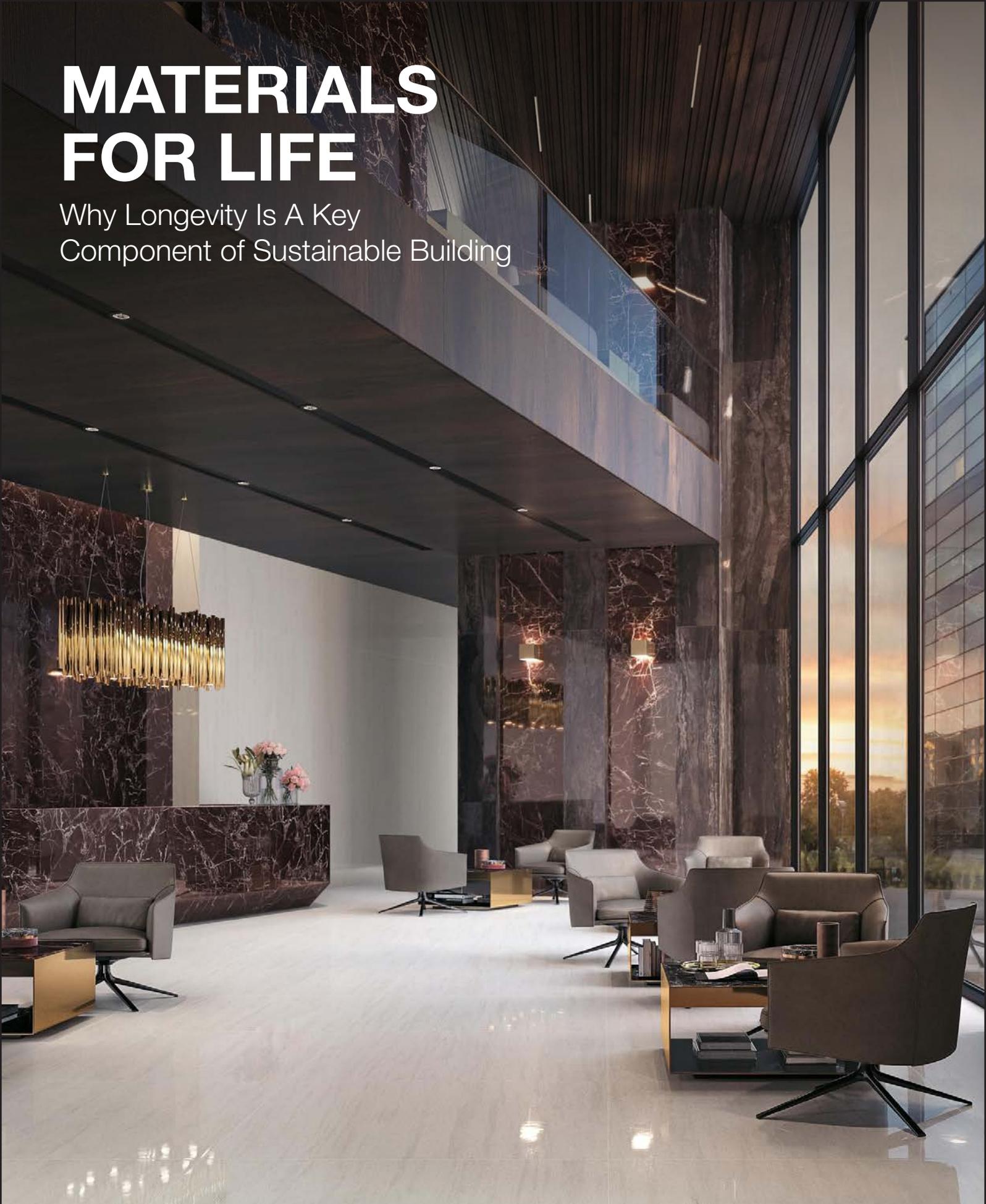


MATERIALS FOR LIFE

Why Longevity Is A Key
Component of Sustainable Building



INTRODUCTION

The building industry, by its very nature, is a massive consumer of natural resources. With growing concerns over climate change and the finite nature of these resources, there is increasing pressure on architects, designers and specifiers to find ways to reduce the environmental impact of the built environment.

Sustainable design seeks to achieve this by addressing the lifecycle impacts of buildings, and the health and comfort of building occupants. It aims to reduce, or completely avoid, depletion of critical resources like energy, water, land and raw materials, and create built environments that are livable, comfortable, safe and productive.

Various aspects of sustainable design have taken hold in modern construction. In Australia, recent changes to the National Construction Code have emphasised thermal efficiency by increasing performance of the building envelope. Manufacturers are looking at ways to reduce energy and water use, while maintaining an ethical supply chain. Projects are setting explicit sustainability targets, and owners are increasingly favouring sustainable products to reduce their personal impact on the environment.

Equally important to the sustainable design movement is designing for longevity. What is it that enables structures to survive for hundreds of years, while others fail to last even a few decades? Durable materials that can stand the test of time without needing to be frequently replaced or repaired. By choosing such materials, the raw materials, energy, and environmental impacts invested in them can be spread out over a longer period of time.

In this whitepaper, we examine specifying building materials through the lens of sustainable longevity and, in this context, present one of the most sustainable finishes available on the market – porcelain stoneware.





WHAT IS SUSTAINABLE LONGEVITY?

When it comes to interior finishes, industry knowledge in design at large was previously focused on appearance, touch and mood. With the shift towards sustainability, designers and specifiers need to look at materials from a more holistic perspective. The whole lifecycle impact of the material must be considered, including responsible sourcing, its expected lifespan, and its potential for recycling and reuse – all these factors determine how sustainable a material is.

Sustainable materials are materials that can be produced in required volumes without depleting non-renewable resources. They are generally materials that have a positive impact on communities and the environment, taking into account how they are sourced, manufactured, used and

disposed of. It is important to remember that sustainability is not an all or nothing proposition – some materials are very eco-friendly, others moderately so and many more have poor sustainability values.

The longevity of a material is inherently tied to its sustainability. A durable building that lasts a long time provides a long period of time to amortise the environmental costs incurred during its construction. Accordingly, resilience and durability are essential characteristics of truly sustainable materials. The longer a material lasts, the less energy and resources are needed to replace it. Further, if the material can remain useful for a longer period of time, there is greater potential for reuse after its initial service life.

WHAT CONSTITUTES A SUSTAINABLE MATERIAL?

Sustainable materials usually share similar health and environmental attributes. Where sustainable longevity is the objective, consider the following factors:

Responsible sourcing

Responsible sourcing is an approach to sourcing and supply chains reflecting a commitment to take into account social, ethical and environmental considerations when dealing with suppliers and customers. It is when a company sources and procures products and services for their operations in an ethical and socially-conscious way. Responsible sourcing provides a holistic approach to managing a product to ensure it is safe, sustainable and meets regulatory requirements.

Lifecycle environmental impact

What are the environmental impacts of a material throughout its entire lifecycle? Answering this question requires considering what resources are needed to produce the material, the pollution and toxic by-products of its manufacturing process, and the embodied emissions in its manufacture, transport and use. Some factors that reduce a material's lifecycle impacts include the use of renewable resources, recycled waste content and energy-efficient manufacturing methods. The material's eventual reuse, recycling, or disposal should also be considered.

Health and wellbeing

A sustainable material is one that does no harm to people in the way that it is used in the built environment from the material's production to its end-of-life. The material should not contain highly toxic compounds, and its production should not result in highly toxic by-products. It should promote good indoor air quality (typically through the reduction of volatile organic compounds (VOCs)). Materials that are easy-to-clean or have anti-bacterial properties also contribute to safe and healthy environments.

Durability

Durability generally refers to the lifespan of the material and its ability to remain useful while withstanding normal wear and tear, degradation and damage during its service life. Durability encompasses a range of properties, including resistance to moisture damage, natural degradation caused by sunlight, pests and insects, and corrosion and decay. The material's ability to withstand various loads and impacts, as well as fire, wind and seismic events are also relevant depending on the application. The right materials and manufacturing processes can increase a product's durability, reducing the need for disposal and replacement.

Durability often goes hand-in-hand with low maintenance. The easier a material is to maintain, the longer it will last. Some materials have to be maintained regularly in order to remain durable. The harder or more expensive it is to maintain, the less likely the owner will successfully do so over its service life.

End-of-life considerations

Sustainable materials are typically those that can be easily reused, recycled or otherwise disposed of in an environmentally-safe manner. Materials that can be used again after the end of their initial service life can help avoid the consumption of energy, raw materials and natural resources needed to produce new products, which in turn reduces pressure on the environment.

A durable building that lasts a long time provides a long period of time to amortise the environmental costs incurred during its construction.

WHY IS LONGEVITY IMPORTANT TO A SUSTAINABLE FUTURE?

Minimising waste and resources used is the building and construction industry's first step towards a reduced overall environmental impact. Accordingly, the choice of materials is critical to achieving the goals of sustainable longevity.

The lifespan of a building material is a key component of its environmental impact – the longer it lasts, the better it is for the environment. Materials that require regular maintenance, replacement or repair are more energy intensive than materials designed for longevity. Take for example, flooring materials that achieve a

desired aesthetic, but need to be constantly refinished, resurfaced or repainted. All these actions require additional energy and resources that are likely never to be recovered.

Materials that cannot be reused or recycled can have a devastating ecological impact. In 2017, the industry generated 20.4 megatonnes (MT) of waste from construction and demolition. Between 2016 and 2017, more than 6.7MT of this waste went into landfills across Australia,¹ contributing to increased pollution and emissions, and the poisoning of the earth.



ASSESSING MATERIAL OPTIONS FOR FLOOR AND WALL APPLICATIONS

There are complex trade-offs when selecting materials for interior applications. Materials that achieve a specific look and feel may not be the most sustainable. At the same time, no material has zero environmental impact. A practical approach is needed when selecting materials that balances how the material is sourced, made and used, the requirements of the application, and how the material performs versus other solutions.

Some common interior finishes raise some obvious concerns. For example, the production of the synthetic fibres used in many carpet products is energy-intensive and contributes to air pollution via the release of sulphur

or nitrogen oxides into the atmosphere. Carpet waste is also a massive contributor to landfills across the globe. Similarly, the production of polyvinyl chloride (PVC) for vinyl flooring releases harmful toxins into the environment.

Widely-used building materials such as concrete and stone also have their drawbacks. Concrete is highly durable, but cement production is the world's single biggest industrial cause of carbon pollution (responsible for 8% of global emissions).² Polished stone such as granite and sandstone provide a premium finish but such materials have high embodied energy, and stone quarries can have a negative impact on the local environment.

WHY CHOOSE PORCELAIN STONEWARE?

Architects and designers should note the relatively short lifespan of some popular materials used for interior applications. Industry sources indicate that wood flooring has a rated life of 25 years, vinyl 15 years and carpet 10 years.³ In comparison, porcelain has a lifespan of over 60 years.

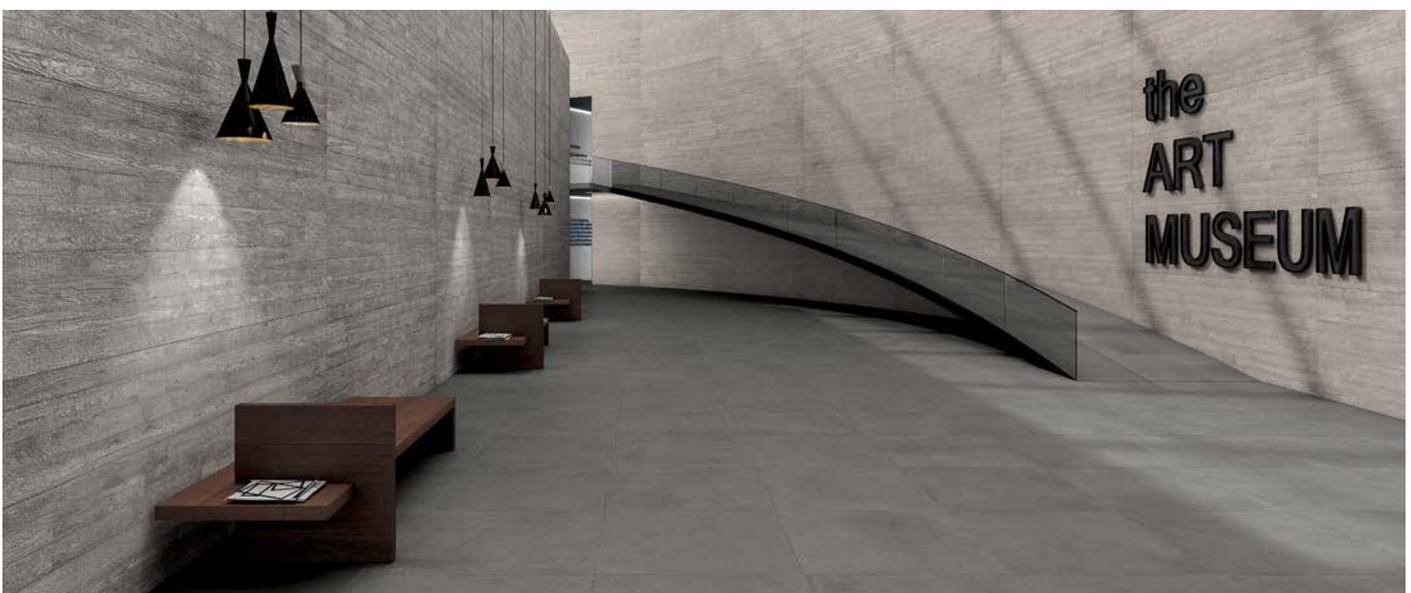
Porcelain stands out as a prime example of a material that fits within the framework of sustainable longevity. By its nature, porcelain is an environmentally-friendly flooring and cladding material. In addition to its very long lifecycle, porcelain is made of natural ingredients – clay and common rocks like feldspar or quartz, and water – all of which are readily available in most areas. The manufacture of porcelain also results in very little waste, as almost the totality of raw materials, glazes and water can be recycled.

Porcelain is a high-quality material that offers architectural benefits for a variety of applications. It offers very low water absorption, and is resistant to adverse weather

conditions, chemicals and acids, and scratches. It is also fireproof, making it suitable for fire-rated applications. These qualities make porcelain one of the most resistant building materials in the world, which contributes to its long duration.

Unlike plastics, carpet floors and some wooden finishes, porcelain does not contain VOCs, and does not emit contaminants into the air. Porcelain tiles are also easy to clean, with some ranges offering antibacterial properties that provide continuous protection against the growth of bacteria that cause biofilms, bad odors and cross contamination.

In addition, porcelain stoneware manufacturers are actively taking steps to increase the sustainability of their manufacturing operations. This includes transitioning production facilities to renewable energy, improving waste management practices, adding recycled content into their products and ensuring all their products are free from carcinogenic substances.



CERAMIC SURFACES AUSTRALIA

Designing for Longevity

Ceramic Surfaces Australia specialise in bespoke porcelain stoneware solutions for a range of complex residential and commercial projects, both interior and landscaping. This Australian-owned and operated company is at the forefront of technology, with principals travelling the world to discover the latest advancements in porcelain products, resulting in a range that is sustainable, innovative and beautiful.

Atlas Concorde and Cotto D'Este are two such companies that Ceramic Surfaces Australia work closely with that put the environment first when designing and manufacturing their tile products. Both companies are committed to reducing their environmental impact through manufacturing innovations, and delivering long-lasting, high-performance solutions. Such companies are also involved with carbon offsets to compensate for the energy used in the manufacturing and freighting of their products.

Atlas Concorde produces excellent porcelain & ceramic materials for floors, walls, furnishings, worktops and outdoor spaces, fully responding to the needs of modern international design. Since 1969 Atlas Concorde has grown solidly on the pillars that its founders established at its inception: innovation, technology, research, ethics, respect for the environment, and confidence in the future.

Atlas Concorde combines the highest levels of product quality with a determined environmental protection programme that spans the entire supply chain. The production plants comply with all stringent international regulations - fully automated and low-impact, as they are equipped with energy cogeneration systems.

A constant commitment to the total reduction of waste and emissions completes the picture of a company orientated towards maximum environmental sustainability.

Cotto d'Este has been producing top-quality porcelain stoneware wall and floor coverings for over 27 years, and are characterised by productive excellence, tireless aesthetic research and meticulous attention to detail. Cotto d'Este also manufactures the innovative Kerlite material, a totally sustainable, ultra-thin and high-performance ceramic tile that revolutionised the industry.

Part of the Panariagroup, Cotto d'Este's mission is to grow and create wellbeing in harmony with the people and the environment. This is reflected in the company's commitment to reducing energy consumption and emissions, using eco-friendly packaging, supporting local suppliers and creating products that improve quality of life.



A practical approach is needed when selecting materials that balances how the material is sourced, made and used, the requirements of the application, and how the material performs versus other solutions.

REFERENCES

- ¹ Australian Government. "National Waste Policy 2018." Department of Agriculture, Water and the Environment. <http://www.environment.gov.au/system/files/resources/d523f4e9-d958-466b-9fd1-3b7d6283f006/files/national-waste-policy-2018.pdf>
- ² Beyond Zero Emissions. "Rethinking cement." BZE. https://bze.org.au/research_release/rethinking-cement
- ³ Bigger, Alan. "Flooring Considerations: Facts Under Foot." FacilitiesNet. <https://www.facilitiesnet.com/flooring/article/Flooring-Considerations-Facts-Under-Foot--2196>

