



EcoBrick - A circular economy solution to transform plastic waste into sustainable concrete

A startup based in Hong Kong, China has developed a circular economy model for a plastic waste solution that promises to transform the buildings sector. EcoBricks upcycles plastic waste from buildings and from construction projects, such as old washing machines and PVC, that would otherwise end up in landfills or dumps or pollute oceans. The Company's objective is to recycle local plastic waste into industry-grade concrete products for local construction projects, which can then be fully recycled into new bricks at end of life. It is offering a solution to an industry that is coming under increasing pressure to become more sustainable across its whole value chain.

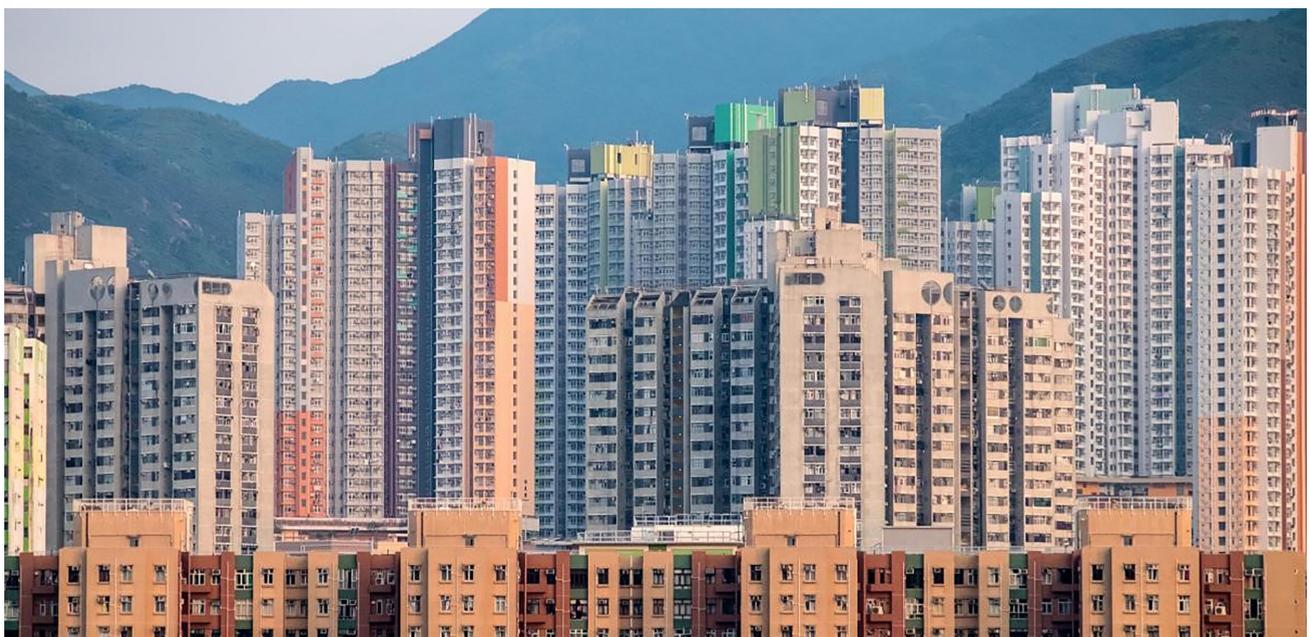
FINDING SOLUTIONS TO MAKE THE BUILT ENVIRONMENT MORE SUSTAINABLE

There is a common misconception that achieving zero carbon and zero waste are separate and distinct, but these two environmental challenges are inter-related. Zero emissions cannot be reached without addressing the growing waste problem. A big part of the problem is the built environment (houses, schools, workplaces, commercial buildings), which uses energy to heat, cool and power itself. It is the single biggest source of waste generation, including plastic waste, and a major contributor to greenhouse gases, with carbon emissions generated during the construction, lifespan, and operation of a building as well as from the disposal of building materials.

The construction industry consumes large amounts of natural resources, particularly sand for the manufacture of concrete. Consumption is growing at an unprecedented rate as urban sprawl continues across the world. It is estimated that there will be 230 billion square meters of new building stock between 2016 and 2060, and every new building will consume more extracted materials (sand, gravel) and generate more waste during its construction and operation. So, finding a solution to make the built environment more sustainable will have a significant impact toward reaching zero waste and zero carbon emissions targets. At the same time, finding sustainable materials is essential to meet the demand for construction in the next decades.

RECYCLING THE UNRECYCLED

EcoBricks has rolled out in Hong Kong, China a concrete solution that replaces virgin materials with local waste materials and seeks to match or outperform conventional concrete. The recycling of plastic waste is 100% cold and clean. The process does not heat, melt or chemically treat plastic, which means far less energy is used, and there is no effluent pollution or chemical byproduct. Manufacturing is low energy and low emission.



▲ *The buildings sector is the single biggest source of waste generation and a major contributor to carbon emissions*



A key factor is that it does not compete with other recyclers in the existing recycling ecosystem because it focuses on plastic waste that is not recycled and ends up in landfills, which makes up 89% of plastic waste collected. It works with large waste managers and recyclers to take waste that they cannot process or recycle or do not want. The ratio of recycled plastic waste versus unrecycled is largely the same the world over, making this type of solution relevant to other countries.

Plastic waste used in making the bricks includes PVC, which has few recycling solutions, concrete waste, glass waste, and locally sourced cement substitutes, which are currently being tested. Alternatives, such as pulverized fly ash from coal power plants or granulated blast slag from steel mills, may be used in other countries if locally available.

By replacing raw materials with local waste materials, the ecological harm caused by mass mining, abstraction, and transportation of heavy materials across long distances is avoided. The bricks are used in local construction projects to demonstrate the importance of recycling to local communities. Any waste generated, including the bricks, can be recycled back into bricks. So, the goal is zero waste from start to finish.

To quantify how much plastic waste can be recycled, just one football pitch of EcoBricks paving is the equivalent of 14.3 million plastic bottles upcycled. The Company's first project is in the Gold Coast Piazza development of Sino Group in Tuen Mun, where it delivered more than 15,000 bricks, which were upcycled from 5.4 tons of plastic waste from 560 old washing machines.

A CIRCULAR ECONOMY MODEL

In developing a solution, EcoBricks looked at the circularity of the product and the building sector. This means working with partners in collecting waste from the buildings that clients have built, using these as raw materials to make concrete products for their new buildings, and pricing concrete products competitively. When clients renovate their buildings, they can send the concrete waste to EcoBricks. This model helps both customers and the industry to become circular even in one of the costliest real estate markets in the world. It saves them the cost of the landfill levy. The Company conducted a life cycle assessment under the ISO 14040 framework to quantify the savings from using local waste materials versus using virgin materials to produce a conventional concrete brick. The study showed that it can reduce the carbon footprint of concrete products by up to 41%, making it possible to make concrete, the world's most consumed man-made material, more sustainable.

Such a solution is critical to the building sector because of the irreversible macro-economic tailwinds that it is facing, which means the future of the industry must be more sustainable, circular, and low waste. That pressure is coming from multiple directions. To deliver on the ambitions of the Paris Agreement, the global target for 2050 is net zero embodied carbon for new buildings, infrastructure, and renovations and net zero operational carbon for all buildings.

The level of investor activism is high, with asset managers and stakeholders pressuring companies they invest in to improve their sustainability credentials and provide detailed disclosures of their entire value chain.

The biggest ESG (environmental, social, and governance) reporting challenge for property developers is providing data on where their building materials come from or where the raw materials for those building materials come from. It is hard to get data because the supply chain is fragmented and opaque. This is where the circularity proposition is powerful. The closer the supply of raw materials and products are in terms of locality, the more transparency there is, and the easier it is to get verifiable and auditable data - from raw material to finished product to end of life.

There are sticks as well as carrots that encourage industry to transform its business model. In Hong Kong, China, where construction is driven by the private sector, the industry is creating incentives to become more sustainable. These include industry rankings and accreditations, such as LEED and BEAM Plus, which give scores of how much waste is recycled.

Ranking high comes with tangible and intangible benefits. Companies are allowed to develop larger areas if their projects have smaller carbon footprints. They help prevent plastic waste from leaching into the natural environment, such as microplastics in oceans, which have direct negative impacts on the ability of the natural world to serve as a carbon sink and on human health. Building a product that is tangible and integrated into local buildings also helps build trust among local communities in the recycling ecosystem and promotes a circular economy ■

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(Source: Development.asian)