

How to make roads with recycled waste and pave the way to a circular economy

November 22 2021, by Salman Shooshtarian, Savindi Caldera, Tayyab Maqsood, Tim Ryley



Credit: Main Roads Western Australia

It cost [A\\$49 million](#) to add 12.5 kilometers of extra lanes to Western Australia's Kwinana Highway, south of Perth's CBD. That's not unusual. On average, building a single lane of road costs about about [A\\$5 million per kilometer](#).

What is unusual about this stretch of extra freeway is not the money but

the materials beneath the bitumen: two stabilizing layers comprised of [25,000 tons of crushed recycled concrete](#), about 90% of which came from the demolition of Subiaco Oval (once Perth's premier football ground).

Recycling building and [construction materials](#) remains the exception to the rule in Australia. The [National Waste Policy](#) agreed to by federal, state and territory governments has a target of 80% resource recovery by 2030. It's currently [about 40%](#).

Of the 74 million tons of waste [generated in Australia in 2020](#), masonry materials comprised about 22.9 million tons. Plastics, by comparison, comprised about 2.5 million tons. Of the 61.5 million tons of "core waste" managed by the waste and resource recovery sector, 44% (27 million tons) came from the construction and demolition sector, compared with 20% (12.6 million tons) from households and local government activities.

Most of this waste—concrete, brick, steel, timber, asphalt and plasterboard or cement sheeting—could be reused or recycled. It ends up in landfill due to simple economics. It's cheaper to buy new materials and throw them away rather than reuse and recycle.

Changing this equation and moving to a circular economy, in which materials are reused and recycled rather than discarded in landfill, is a key goal to reduce the impact of building and construction on the environment, including its contribution to climate change.

The economics of 'externalities'

The fact it is more "economic" to throw materials away than reuse them is what economists call a market failure, driven by the problem of "externalities." That is, the social and [environmental costs](#) of producing,

consuming and throwing away materials is not reflected in the prices charged. Those costs are instead externalized—borne by others.

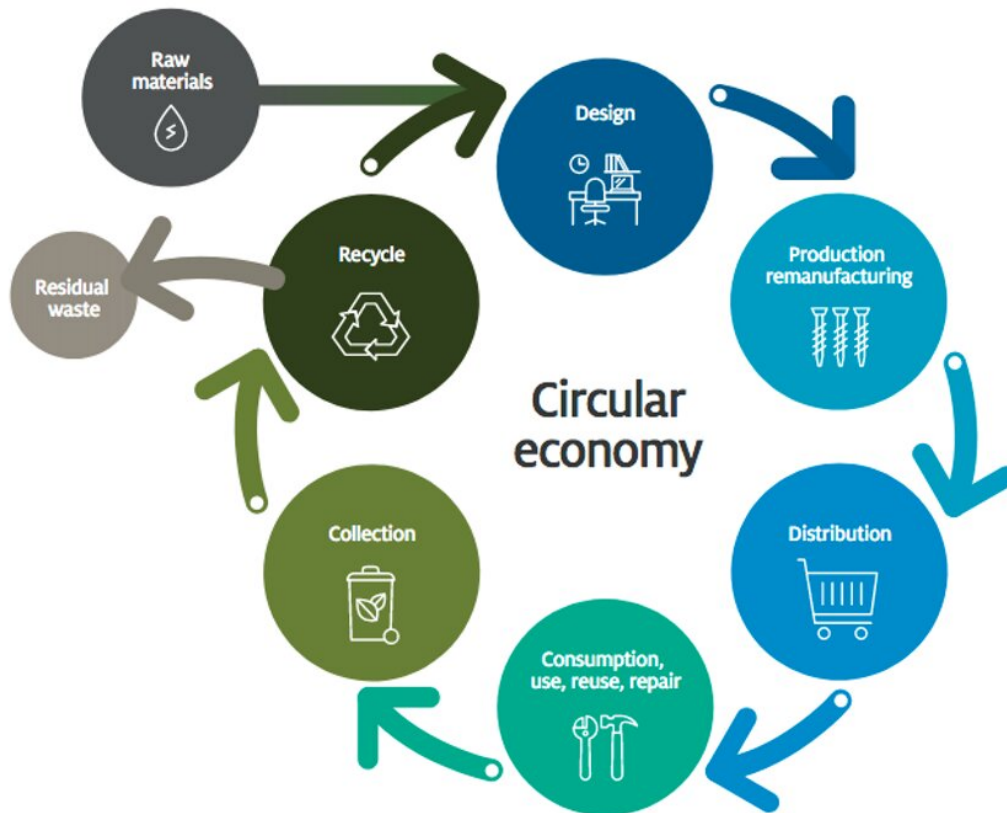
In such cases there is a legitimate—and necessary—role for governments to intervene and correct the [market failure](#). For an externality such as carbon emissions (imposing costs on [future generations](#)) the market-based solution favored by most economists is a carbon price.

For construction material waste, governments have a few more [policy](#) levers to help create a viable market for more recycling.

Using procurement policies

One way to make recycling more attractive to businesses would be to increase the cost of sending waste materials to landfill. But this would likely have unintended consequences, such as illegal dumping.

The more obvious and effective approach is to help create more demand for recycled materials through government procurement, adopting policies that require suppliers to, for example, use a minimum amount of recycled materials.



Australian Government, Sustainable Procurement Guide: A practical guide for Commonwealth entities, 2021

With enough demand, recyclers will invest in further waste recovery, reducing the costs. Lower costs in turn create the possibility of greater demand, creating a virtuous circle that leads to a circular economy.

Australia's federal, state and territory governments all have sustainable procurement policies. The federal [Sustainable Procurement Guide](#) states the Australian government "is committed to transforming Australia's waste into a resource, where most goods and services can be continually used, reused, recycled and reprocessed as part of a circular economy."

But these policies lack some basic elements.

Three key market-making reforms

Our research suggests three important reforms could make a big difference to waste market operations. This is based on interviewing 27 stakeholders from the private sector and government about how to improve sustainable procurement.

First, government waste policies that set aspirational goals are not supported by procurement policies setting mandatory minimum recycled content targets. All contractors on [government](#)-funded construction projects should be required to use a percentage of recycled [waste](#) materials.

Second, the nature of salvaging construction materials means quality can vary significantly. Cement recycled from a demolition site, for example, could contain contaminants that reduce its durability.

Governments can help the market through regularly auditing the quality of recycler's processes, to increase buyer confidence and motivate suppliers to invest in production technologies.

Third, in some states (such as Western Australia) the testing regimes for recycled construction products are more complex than that what applies to raw materials. More reasonable specifications would reduce compliance [costs](#) and thereby the cost of using recycled materials.

This article is republished from [The Conversation](#) under a Creative Commons license. Read the [original article](#).

Provided by The Conversation

Citation: How to make roads with recycled waste and pave the way to a circular economy (2021, November 22) retrieved 3 May 2024 from <https://techxplore.com/news/2021-11-roads-recycled-pave-circular-economy.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.