

SYDNEY | URBAN TRANSFORMATION

From Polluted Terminal to Carbon-Neutral Precinct

The redeveloped precinct of Barangaroo, Sydney, is the first in Australia to achieve carbon-neutral status. The success of this urban renewal project demonstrates the potential for similar sustainable ventures in the country.



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Millers Point Gasworks brought the first coal gas street lights to Sydney but left East Darling Harbour contaminated with large deposits of coal tar.
Image: Mitchell Library, State Library of New South Wales

|| The precinct is Sydney's most significant urban renewal project in 20 years.



The Challenge

The East Darling Harbour area in Sydney was once bustling with maritime and industrial activities over 100 years ago. This was home to the Millers Point Gasworks, which brought gas street lighting to Sydney (and Australia) in the 19th century. More than a century later in the 1960s, the container shipping revolution saw the area transformed into a busy container terminal. By the end of the 20th century, however, shipping technology changes and accessibility issues meant that the site was no longer viable for such functions. Container shipping operations were relocated to a port on the other side of Sydney, and the harbour fell into disuse.

The gasworks and shipping activities had left the East Darling Harbour area, especially its port, heavily polluted. Notably, the site

contained highly contaminated groundwater as well as asbestos.

In 2003, the New South Wales (NSW) government announced the area would be transformed into a new urban precinct—Sydney's most significant urban renewal project in 20 years. Six years later, they committed the precinct to the C40 Cities Climate Positive Development Program, a recognition framework promoting sustainable urban development models that successfully reduce greenhouse gas emissions below zero.

Construction work on the precinct—now named Barangaroo—began in 2012. Development plans focused on attaining carbon-neutral, water-positive, zero-waste and socially sustainable outcomes.



To meet their sustainability goals, the NSW Government made it a bidding process requirement to deliver a Climate Positive result.



The Solution

The newly redeveloped precinct of Barangaroo will span 22 hectares (0.22 km²) and be divided into three areas:

- **Barangaroo Reserve:** Six hectares (60,000 m²) of open space with walking and cycling trails. This area officially opened in 2015.
- **Central Barangaroo:** The area's cultural and civic centre, with spaces for recreation, events and entertainment. Construction is expected to be completed by 2024.
- **Barangaroo South:** A neighbourhood containing residential and commercial buildings, as well as shops, cafes, restaurants and cultural facilities. Construction of all commercial and retail buildings finished in 2019, while the rest of the area will be completed by 2026.

To meet their sustainability goals, the NSW government made it a bidding process requirement to deliver a Climate Positive result, i.e., achieving net-negative operational greenhouse gas emissions.

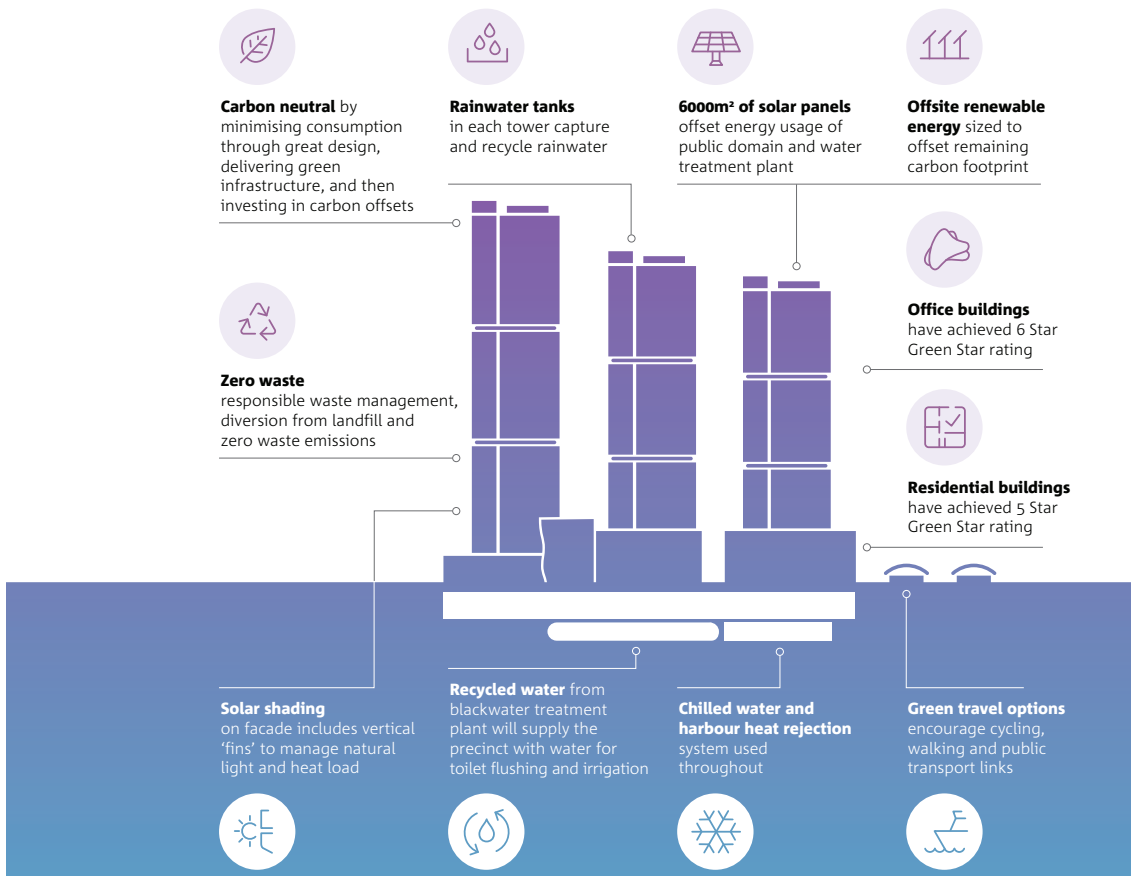
Being water-positive means Barangaroo recycles more water than the drinking water it imports. To achieve this, 100% of the water used and produced at the precinct is recycled. In addition to blackwater and greywater from toilets, showers and restaurants, additional water is extracted from rainwater harvesting, cooling tower backwash and the sewer main (during times of low load).

The recycled water treatment plant sits in a 77,000 m² basement beneath Barangaroo South, along with other cooling, heating and water infrastructure. Instead of having separate systems set up for different buildings, the systems located in the basement power nine buildings in Barangaroo.

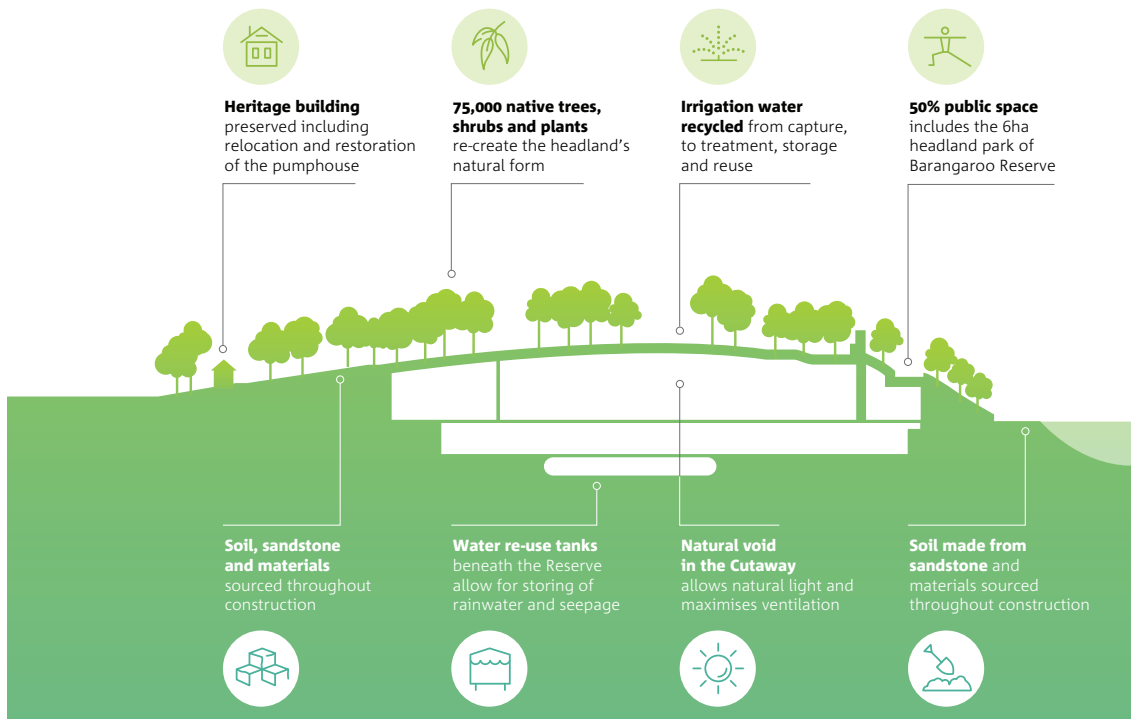
Also located in the basement is the District Cooling Plant that powers all air conditioning units in Barangaroo South. It uses water from the Sydney Harbour instead of piped water, saving approximately 40 Olympic-sized swimming pools of water each year.

Placing all this infrastructure in the basement—normally located on roofs—freed up the roofs of

Barangaroo's southern precinct



Barangaroo Reserve



An overview of the features at Barangaroo South and Barangaroo Reserve, many of which contribute to the carbon-neutral and water-positive outcomes at the precinct.

Image: Barangaroo Delivery Authority, *Barangaroo Sustainability in Practice Fact Sheet*

Barangaroo's buildings to be fitted with 6,000 m² of solar panels instead. In turn, these panels generate the energy that powers the recycled water treatment plant in the basement, as well as the public domain lighting of Barangaroo South.

In working towards zero-waste output, Lendlease, the developer for Barangaroo South, took a novel approach by appointing an eco-concierge for the residential and commercial tenants in the area. The eco-concierge works directly with the tenants to achieve the prioritised sustainability goals, going beyond giving information. This involves directing tenants to opportunities to reduce waste and recycle. Support is also given to smaller tenants and retailers,

who do not have green initiatives in place, to lessen their daily environmental footprint.

But while infrastructure and operational requirements can pave the way towards achieving sustainability outcomes, a shared belief in the goal can make an even bigger difference. "You can't underestimate the importance of connecting with people on a values level," Lucy Sharman, the then eco-concierge at Barangaroo, told Property Australia in a 2018 interview. "Once we explained our vision for Barangaroo South, almost without exception, people come on board."

This new initiative has helped buildings in Barangaroo to recycle 19 different waste streams,

resulting in 80% of waste from residential and commercial buildings being diverted from landfills between 2015 and 2018.



View of Barangaroo's new skyline from Balmain.
Image: Zetter / iStock



All three commercial office towers in Barangaroo South have been awarded 6-Star Green Star Office Design ratings by the Green Building Council of Australia. This makes them the most sustainable high-rise office buildings in the country.

Image: Zetter / iStock

It is imperative that cities develop and grow sustainably to help slow the increase in global temperatures. Barangaroo...can be seen as a model for sustainable development.

The Outcome

Cities take up just 3% of Earth's land today, but they chalk up 60–80% of global energy consumption and 75% of carbon emissions. To mitigate global warming caused by these emissions, the Paris Agreement treaty was drawn up in 2015 and adopted by 196 countries, including Australia. It sets out the goal to limit global warming to below 2°C (ideally 1.5°C) as compared with pre-industrial levels.

At current rates, global warming is likely to reach 1.5°C between 2030 and 2052. Therefore, it is imperative that cities develop and grow sustainably to help slow the increase in global temperatures.

Barangaroo, as one of only 19 projects in the Climate Positive Development Program, is a model for sustainable development. The precinct was awarded carbon-neutral status by the Commonwealth Government (under their Climate Active programme) in 2019, and it has since maintained the certification for three consecutive years. Once complete, it is expected to create 23,000 permanent

jobs, house 3,500 residents and contribute over A\$2 billion (S\$1.95 billion) a year to the NSW economy—demonstrating that urban developments can operate sustainably without compromising their economic viability.

Beyond sustainability outcomes, the Barangaroo project has also raised awareness of the area's Indigenous history and created employment opportunities for First Nations peoples. Lendlease, for example, works with the majority Indigenous-owned company, NPM Indigenous (NPMI), to establish an Indigenous-based supply chain to support the development. So far, metalwork and masonry contracts as well as the design of the green roof have involved Indigenous-owned companies and Indigenous workers.

As a precinct, Barangaroo operates on a small scale and may not encounter the same challenges facing larger urban settlements. Nevertheless, its success paints a hopeful picture for the future of sustainable development in Australia. ↻