# Kew Gardens to create UK’s first net-zero Victorian glasshouses in £60m overhaul



The Royal Botanic Gardens, Kew, is set to embark on an ambitious £50-60 million restoration project to transform two of its most iconic glasshouses—the Victorian Palm House and the adjacent Waterlily House—into the first net-zero heritage buildings of their kind. The Grade I listed Palm House, built between 1844 and 1848 with wrought-iron structures inspired by shipbuilding techniques, and the Grade II listed Waterlily House, completed in 1852, are at the centre of this extensive overhaul planned to start in 2027 and last up to five years.

Both glasshouses currently show significant signs of deterioration and fall short of modern energy efficiency standards, with their aging heating, electrical, and watering systems needing urgent replacement. The project aims to not only conserve these historic structures, which house over 1,300 rare and endangered tropical plant species—including the remarkable giant Amazon waterlilies—but also to decarbonise their operations in line with Kew’s Climate Positive 2030 strategy. This will include replacing approximately 16,500 panes of glass using clear silicone gaskets to improve insulation and reduce heat loss from the humid tropical environment vital for the plants.

Key to the project is the delicate conservation of the wrought-iron frameworks, which have required cyclical maintenance due to the high humidity and temperature conditions essential for the glasshouses’ living collections. These structures had previously transitioned from coal to oil, then gas power sources, and the current plan involves exploring renewable energy options to ensure a sustainable future for the site.

The renovation will also enhance visitor experience by creating a new circular gathering space within the Palm House, intended for education and raising awareness about rainforest conservation. Accessibility improvements include replacing an existing footpath with a new double ramp to better accommodate disabled visitors. Furthermore, the Palm House basement is set for a revamp that will improve the resilience of heating and irrigation systems while providing dedicated, improved spaces for the horticulturists who care for the plants.

The ongoing process of relocating the plant specimens has already begun, with many housed temporarily in innovative new glasshouses designed to support tropical cultivation sustainably—such as the Propagation Glasshouse and the Decant Glasshouse. These facilities are equipped with advanced environmental controls to maintain temperature, humidity, and lighting conditions suitable for some of the world's rarest and most threatened plants, ensuring their survival during the restoration period.

Hugh Broughton, founding director of Hugh Broughton Architects, expressed that this project will conserve and decarbonise these iconic glasshouses, making them more accessible to the public while paying homage to Victorian architectural innovation. He described the buildings as "instantly recognisable icons of Victorian innovation" whose designs were groundbreaking in their era, inspiring generations of architects and engineers.

The project is a collaborative effort involving historic building specialists including Martin Ashley Architects, consulting engineers Cundall and Ramboll, and conservation architects Donald Insall Associates. Allford Hall Monaghan Morris (AHMM) is also involved, undertaking architectural design and principal design roles. The work is overseen by members of Kew’s Executive Board, ensuring that heritage preservation is balanced with cutting-edge sustainability measures.

This restoration follows previous major conservation efforts at Kew, such as the 2018 renovation of the Temperate House, then the largest restoration project in Kew’s history. The Palm House project is equally ambitious, aiming to secure the future of two of the UK's most treasured cultural and botanical landmarks.

Head of sustainability at Kew, Rachel Purdon, emphasised the significance of the endeavour: “We’re at a pivotal moment for two of the UK’s most iconic glasshouses... If we can realise this ambition, the project will become a beacon of excellence in heritage conservation and sustainable development.” The restoration reflects a broader commitment by Kew Gardens to sustainability, aiming to protect crucial living collections while also reducing carbon emissions to combat climate change.

The glasshouses themselves are vital habitats for an extraordinary array of tropical plants, including the famous giant Victoria boliviana waterlilies with their immense pads and fleeting, fragrant flowers, as well as brightly coloured climbers that fill the structures with life and colour.

Once completed, this restoration will mark a new chapter for the Palm House and Waterlily House by preserving their historical legacy, enhancing public engagement, and positioning them as exemplars of sustainable heritage conservation for future generations to enjoy.

### 📌 Reference Map:

* Paragraph 1 – [[1]](https://www.architectsjournal.co.uk/news/hugh-broughton-unveils-plans-for-50m-kew-gardens-palm-house-overhaul), [[5]](https://www.standard.co.uk/news/london/kew-gardens-palm-house-closure-renovation-b1238367.html)
* Paragraph 2 – [[1]](https://www.architectsjournal.co.uk/news/hugh-broughton-unveils-plans-for-50m-kew-gardens-palm-house-overhaul), [[2]](https://www.kew.org/kew-gardens/palm-house-renovation), [[4]](https://www.cundall.com/projects/palm-house-at-royal-botanic-gardens-kew)
* Paragraph 3 – [[1]](https://www.architectsjournal.co.uk/news/hugh-broughton-unveils-plans-for-50m-kew-gardens-palm-house-overhaul), [[5]](https://www.standard.co.uk/news/london/kew-gardens-palm-house-closure-renovation-b1238367.html)
* Paragraph 4 – [[1]](https://www.architectsjournal.co.uk/news/hugh-broughton-unveils-plans-for-50m-kew-gardens-palm-house-overhaul), [[6]](https://www.kew.org/about-us/press-media/new-decant-glasshouses)
* Paragraph 5 – [[1]](https://www.architectsjournal.co.uk/news/hugh-broughton-unveils-plans-for-50m-kew-gardens-palm-house-overhaul), [[6]](https://www.kew.org/about-us/press-media/new-decant-glasshouses)
* Paragraph 6 – [[1]](https://www.architectsjournal.co.uk/news/hugh-broughton-unveils-plans-for-50m-kew-gardens-palm-house-overhaul), [[3]](https://www.ahmm.co.uk/projects/conservation/the-palm-house-at-kew/)
* Paragraph 7 – [[1]](https://www.architectsjournal.co.uk/news/hugh-broughton-unveils-plans-for-50m-kew-gardens-palm-house-overhaul), [[3]](https://www.ahmm.co.uk/projects/conservation/the-palm-house-at-kew/), [[4]](https://www.cundall.com/projects/palm-house-at-royal-botanic-gardens-kew)
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* Paragraph 9 – [[1]](https://www.architectsjournal.co.uk/news/hugh-broughton-unveils-plans-for-50m-kew-gardens-palm-house-overhaul), [[2]](https://www.kew.org/kew-gardens/palm-house-renovation)
* Paragraph 10 – [[1]](https://www.architectsjournal.co.uk/news/hugh-broughton-unveils-plans-for-50m-kew-gardens-palm-house-overhaul), [[7]](https://www.kew.org/kew-gardens/whats-in-the-gardens/waterlily-house)

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## Bibliography

1. <https://www.architectsjournal.co.uk/news/hugh-broughton-unveils-plans-for-50m-kew-gardens-palm-house-overhaul> - Please view link - unable to able to access data
2. <https://www.kew.org/kew-gardens/palm-house-renovation> - The Royal Botanic Gardens, Kew, is undertaking an ambitious project to transform the iconic Palm House and Waterlily House into the first net-zero buildings of their kind. The Grade I and II listed glasshouses are showing serious signs of deterioration and are not energy efficient. The renovation aims to replace the heating, electrical, and watering systems with innovative, sustainable solutions to support Kew’s goal of becoming climate positive by 2030. The project includes rehoming the plants, with some being moved to other areas of the Gardens and others propagated in Kew’s Tropical Nursery. The Palm House and Waterlily House remain open to visitors, but some changes may be noticed as horticulturists prepare the plants for renovation. The project is expected to begin in 2027, pending successful funding, and is anticipated to last around four years. Support for the renovation is welcomed to help preserve the iconic glasshouses and the irreplaceable plant collections.
3. <https://www.ahmm.co.uk/projects/conservation/the-palm-house-at-kew/> - Allford Hall Monaghan Morris (AHMM) is collaborating with the Royal Botanic Gardens, Kew, to provide architectural design, principal designer, and lead designer services for the restoration of Kew’s iconic Palm House and Waterlily House. The project aims to repair and decarbonise the Grade I listed Palm House and Grade II listed Waterlily House, ensuring their conservation for future generations. The Palm House and Waterlily House were designed and constructed in the 1840s-50s by architect Decimus Burton and engineer Richard Turner. The renovation includes replacing the building services systems with a net-zero carbon ready solution for heating, cooling, ventilation, and all services. AHMM is working in close collaboration with consulting engineers Cundall and Ramboll, and heritage consultants and conservation architects Donald Insall Associates. The project is overseen by Kew Executive Board members Richard Barley (Director of Gardens) and Richard Deverell (Director, Royal Botanic Gardens Kew).
4. <https://www.cundall.com/projects/palm-house-at-royal-botanic-gardens-kew> - Cundall is working with the Royal Botanic Gardens, Kew, as decarbonisation consultants to assist with the restoration of Kew’s iconic Palm House. The refurbishment aims to introduce lower energy heating systems, supporting Kew’s sustainability strategy, which aims to reduce carbon emissions and reach climate positive by 2030. The Palm House and Waterlily House are Grade I and II listed buildings within a UNESCO World Heritage site. The project includes a full net-zero carbon refurbishment of the Palm House and Waterlily House, with a retrofit strategy that includes low-energy solutions for heating and efficient water conservation systems. Cundall has worked closely with the client and the wider design team to create a tailored plan of interventions for the glasshouse that is respectful of the building’s heritage, incorporates low-carbon technologies, and maintains conditions for Kew’s irreplaceable collection of plants.
5. <https://www.standard.co.uk/news/london/kew-gardens-palm-house-closure-renovation-b1238367.html> - The famous Palm House in Kew Gardens is set to close for five years as it embarks on a £60 million major restoration project. Plans to renovate the attraction, which sits at the heart of the Royal Botanic Gardens Kew, will involve moving 1,300 plants, replacing 16,000 panes of glass, and cleaning up hundreds of tonnes of iron. Last updated in the 1980s, this renovation aims to transform the buildings into the first net-zero heritage buildings of their kind, preserving the Victorian glasshouse for generations to come. Hot and humid conditions inside the glasshouse have taken their toll on the building, particularly the iron structure, which is suffering from corrosion. The glasshouse will be closed for four to five years from 2027 to reduce admissions from the Palm House to net zero. Visitors can already see specialist work taking place to re-pot and air-layer plants to ensure the survival of over 1,000 plant species housed within.
6. <https://www.kew.org/about-us/press-media/new-decant-glasshouses> - Kew Gardens has unveiled two state-of-the-art glasshouses, one permanent and one temporary, as part of its ambitious project to renovate the iconic Palm House and Waterlily House. These glasshouses have been designed for the cultivation of tropical plants during the upcoming renovation. Each uses advanced systems to control the temperature, humidity, and light management in a more sustainable way. The Propagation Glasshouse is a new permanent structure, constructed behind the scenes close to Kew’s Tropical Nursery. The Decant Glasshouse has been built behind the Palm House using similar specifications but to a greater height to accommodate taller specimens. Together, these structures will house some of the world’s rarest and most threatened plants. The completion of the Propagation Glasshouse and Decant Glasshouse marks a significant milestone in Kew’s ongoing efforts to improve the sustainable management of energy-intensive buildings and builds upon Kew’s wider sustainability strategy with a target to become Climate Positive by 2030.
7. <https://www.kew.org/kew-gardens/whats-in-the-gardens/waterlily-house> - The Waterlily House at Kew Gardens is a small, square glasshouse designed specifically to showcase the giant Amazon waterlily (Victoria amazonica). Completed in 1852, it is now a listed building, brimming with aquatic plants and tropical fruit. Its circular pond spans over 10 metres. The Waterlily House features the record-breaking giant Victoria boliviana, named as a new species by a team from Kew in 2022. Their lily pads grow up to three metres wide, with prickly undersides and wide, upturned rims. The flowers are large and fragrant, but only last for 48 hours. They start out white, then darken to pink for the second night they are open, before sinking beneath the surface of the water. The collection also includes brightly coloured flowering climbers that trail the ceiling of the glasshouse, enhancing an environment that is teeming with life at every angle.