# Kew Gardens to pioneer net-zero heritage glasshouses with major Palm House renovation



Two of London's most iconic Victorian glasshouses at Kew Gardens, the Palm House and the Waterlily House, are set to undergo a major renovation aimed at making them the first heritage net-zero glasshouses in the world. The project, led by Hugh Broughton Architects in collaboration with Kew’s Capital Projects Team, marks a significant stride in combining historic preservation with cutting-edge sustainability measures.

The Palm House, built between 1844 and 1848 and recognised as the oldest surviving Victorian glasshouse globally, has long struggled with energy inefficiency and structural deterioration. Its wrought iron frame suffers from corrosion accelerated by the humid conditions essential for its plant collections. Similarly, the Waterlily House, designed by the same architect Decimus Burton and iron-maker Richard Turner in 1852, shows signs of wear. Both buildings have historically relied on coal, oil, and gas for heating—methods now rendered obsolete by the planned shift to a sustainable heating system.

Hugh Broughton Architects will implement a fully electrified heating system utilising air- and water-source heat pumps, designed to drastically reduce carbon emissions and achieve operational net-zero status. This transition is a world-first in the heritage glasshouse sector, offering a model for others aiming to marry conservation with climate responsibility. The renovation will also replace 16,500 glass panes installed in the 1980s with new, high-performance glazing sealed with bespoke clear silicone gaskets to reduce heat loss. Additionally, original vents will be reinstated to improve airflow, while systems for rainwater harvesting and irrigation will be maximised to conserve resources.

“The Palm House and Waterlily House at Kew Gardens are instantly recognisable icons of Victorian innovation,” Hugh Broughton noted, highlighting the historical significance of these structures. “Their designs were truly groundbreaking for their time, helping to conserve extraordinary plant collections and inspiring architects and engineers for generations.” He added that the renovation will maintain the buildings' heritage while making them more accessible and sustainable, aligning with Kew’s Climate Positive 2030 strategy.

Kew Gardens’ head of sustainability, Rachel Purdon, emphasised the institution’s commitment to integrating sustainability into its mission. She described the project as a pioneering effort to deploy state-of-the-art technology in glasshouse environments, signalling a future where historic horticultural spaces can also be leaders in climate action.

The interiors of the buildings will be thoughtfully upgraded to enhance visitor experience and accessibility. Palm House will feature a central gathering space along with new seating in its north and south apses, while Waterlily House renovations will focus on improving access for all visitors. Outside, the original ornamental garden design by William Nesfield surrounding Palm House will be restored, further honouring the site's history.

Ahead of these renovations, Kew has already inaugurated two new glasshouses designed for plant propagation and cultivation. Both utilise sustainable technology such as air-source heat pumps and extensive rainwater capture tanks, exemplifying the garden’s broader ambition to reduce its environmental impact.

The renovation is due to commence in 2027 and is expected to last four to five years. During this time, approximately 1,300 plants will be carefully relocated, with particularly large or fragile specimens propagated on-site to ensure their survival.

The effort also includes collaboration with heritage conservation specialists, structural and services engineers, and quantity surveyors to balance respect for historical fabric with modern performance improvements. This meticulous approach aims to preserve the delicate ironwork and fabric of these glasshouses while upgrading their infrastructure for efficiency and longevity.

Ultimately, the project stands as a landmark initiative, blending heritage conservation with pioneering sustainability to protect both an architectural treasure and a vital collection of tropical plant life. It reflects a growing recognition within historic environments of the need to address climate change through innovative and responsible renovations.

### 📌 Reference Map:

* Paragraph 1 – [[1]](https://www.dezeen.com/2025/07/17/kew-gardens-palm-house-waterlily-house-net-zero/), [[2]](https://www.kew.org/kew-gardens/palm-house-renovation), [[3]](https://www.kew.org/about-us/press-media/palm-house-renovation)
* Paragraph 2 – [[1]](https://www.dezeen.com/2025/07/17/kew-gardens-palm-house-waterlily-house-net-zero/), [[2]](https://www.kew.org/kew-gardens/palm-house-renovation), [[3]](https://www.kew.org/about-us/press-media/palm-house-renovation), [[6]](https://www.cundall.com/projects/palm-house-at-royal-botanic-gardens-kew)
* Paragraph 3 – [[1]](https://www.dezeen.com/2025/07/17/kew-gardens-palm-house-waterlily-house-net-zero/), [[3]](https://www.kew.org/about-us/press-media/palm-house-renovation), [[5]](https://www.standard.co.uk/news/london/kew-gardens-palm-house-closure-renovation-b1238367.html), [[7]](https://www.itv.com/news/london/2025-07-16/kews-palm-house-to-shut-for-renovations-as-part-of-push-towards-net-zero)
* Paragraph 4 – [[1]](https://www.dezeen.com/2025/07/17/kew-gardens-palm-house-waterlily-house-net-zero/), [[3]](https://www.kew.org/about-us/press-media/palm-house-renovation), [[7]](https://www.itv.com/news/london/2025-07-16/kews-palm-house-to-shut-for-renovations-as-part-of-push-towards-net-zero)
* Paragraph 5 – [[1]](https://www.dezeen.com/2025/07/17/kew-gardens-palm-house-waterlily-house-net-zero/), [[2]](https://www.kew.org/kew-gardens/palm-house-renovation)
* Paragraph 6 – [[1]](https://www.dezeen.com/2025/07/17/kew-gardens-palm-house-waterlily-house-net-zero/)
* Paragraph 7 – [[4]](https://www.kew.org/about-us/press-media/new-decant-glasshouses)
* Paragraph 8 – [[1]](https://www.dezeen.com/2025/07/17/kew-gardens-palm-house-waterlily-house-net-zero/), [[5]](https://www.standard.co.uk/news/london/kew-gardens-palm-house-closure-renovation-b1238367.html)
* Paragraph 9 – [[1]](https://www.dezeen.com/2025/07/17/kew-gardens-palm-house-waterlily-house-net-zero/), [[6]](https://www.cundall.com/projects/palm-house-at-royal-botanic-gardens-kew)
* Paragraph 10 – [[1]](https://www.dezeen.com/2025/07/17/kew-gardens-palm-house-waterlily-house-net-zero/), [[2]](https://www.kew.org/kew-gardens/palm-house-renovation)

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## Bibliography

1. <https://www.dezeen.com/2025/07/17/kew-gardens-palm-house-waterlily-house-net-zero/> - 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 a significant project to conserve and transform the iconic Palm House and Waterlily House into the first net-zero heritage glasshouses globally. The renovation includes replacing heating, electrical, and watering systems with innovative, sustainable solutions to support Kew's goal of becoming climate positive by 2030. The project aims to preserve these Victorian glasshouses for future generations and protect remarkable tropical plants from some of the most threatened environments worldwide.
3. <https://www.kew.org/about-us/press-media/palm-house-renovation> - Kew Gardens has submitted a planning application to the London Borough of Richmond upon Thames for a landmark renovation of the Palm House and Waterlily House. The proposed renovation aims to create the first heritage net-zero glasshouses of their kind, conserving two of the UK's most iconic buildings while radically reimagining their design for a more sustainable future. The project includes replacing 16,500 glass panes with high-performance sealed glazing, using bespoke silicone gaskets to reduce heat loss, and installing a fully electrified air and water source heat pump system.
4. <https://www.kew.org/about-us/press-media/new-decant-glasshouses> - Ahead of the Palm House renovation, Kew Gardens has unveiled two state-of-the-art glasshouses for plant cultivation and propagation. The Propagation Glasshouse is powered entirely by air source heat pumps, providing a sustainable solution that reduces the carbon footprint while regulating internal temperatures. The Decant Glasshouse features a 40,000-litre rainwater capture tank to store and filter water, ensuring that water used in the glasshouses is collected, filtered, and reused, reducing reliance on potable water and lowering the environmental impact.
5. <https://www.standard.co.uk/news/london/kew-gardens-palm-house-closure-renovation-b1238367.html> - The Palm House at Kew Gardens is set to close for four to five years starting in 2027 as part of a £60 million major restoration project. The renovation aims to transform the building into the first net-zero heritage glasshouse of its kind, preserving the Victorian glasshouse for generations to come. The project includes moving 1,300 plants, replacing 16,000 panes of glass, and cleaning up hundreds of tonnes of iron. The goal is to improve the building's energy efficiency and reduce its carbon footprint.
6. <https://www.cundall.com/projects/palm-house-at-royal-botanic-gardens-kew> - Cundall is collaborating with the Royal Botanic Gardens, Kew, on the refurbishment and decarbonisation of the iconic Palm House to create a net-zero carbon glasshouse. The project involves developing a retrofit strategy that includes low-energy solutions for heating and efficient water conservation systems to serve the glasshouses sustainably. The refurbishment aims to be respectful of the building's heritage while improving its operation and delivering improved internal conditions for the plants.
7. <https://www.itv.com/news/london/2025-07-16/kews-palm-house-to-shut-for-renovations-as-part-of-push-towards-net-zero> - The Palm House at Kew Gardens is set to close for up to five years as part of a £60 million push towards net-zero. Renovations to the listed building, alongside its companion the Waterlily House, are part of a conservation project to create the 'first heritage net-zero glasshouses of their kind'. The project includes replacing 16,500 glass panes with high-performance sealed glazing, using bespoke silicone gaskets to reduce heat loss, and installing a fully electrified air and water source heat pump system.