



Energy &
Environment
Alliance



EEA CASE STUDY

The Peninsula London

Built to Endure.
Engineered to Perform.



Building for long-term performance

The economics of hospitality real estate have changed. Energy markets remain volatile, insurers are tightening terms, regulators are advancing disclosure obligations, and lenders increasingly assess both physical and transition risks at the asset level. Corporate travel buyers now request evidence of building performance, resilience and environmental quality. In this changing landscape, building performance is no longer a technical aspiration - it is a financial advantage.

The Peninsula London was conceived as a new-build, 62,737.4 m² ultra-luxury hotel and branded residences intended to remain competitive, resilient and efficient for decades. As a long-term owner-operator, The Hongkong and Shanghai Hotels (HSH) approached the project as a 100-year asset, with a brief that prioritised:

- Improved guest comfort,
- High operational efficiency,
- Stable long-term operating costs,
- Climate resilience measures against physical and transition risks, and
- Verifiable, investor-grade performance data.

From demolition to handover, the project reflects this strategy. The previous structures on site were removed with 100% diversion of demolition waste and 99.5% diversion of construction waste from landfill, signalling disciplined material management and reduced embodied impact.

The resulting asset operates with significantly stronger performance than a typical new-build hotel:

- BREEAM Excellent (72.75%), still rare for ultra-luxury hospitality
- BER 33 vs TER 46.7 kg CO₂/m²·yr, ~29% better than the regulatory threshold
- >22% lower delivered energy (design-stage modelling)
- Airtightness of 2.69 m³/h·m² @ 50 Pa
- 100% zero-emission electricity from construction onwards

These outcomes result from a coordinated architectural, engineering and operations methodology designed to embed long-term performance from the very beginning, backed by HSH's Sustainable Luxury Vision.

What makes this building perform?

A fabric-first, systems-efficient, controls-led design strategy

The building's performance comes from a high-quality envelope - an airtight exterior, well-insulated and engineered to minimise heat loss and unwanted solar gain - combined with efficient mechanical systems, including heat-recovery ventilation and smart building controls that keep heating, cooling and lighting within optimal ranges.

Envelope performance (the foundation of efficiency)

- Airtightness at 2.69 m³/h·m² @ 50 Pa, significantly outperforming standard new-build hospitality benchmarks, reducing heating and cooling loads
- A façade co-developed by architects, façade engineers and contractors using thermal-bridge modelling to eliminate cold spots and energy leakage points
- Selective double glazing and shading designed to balance daylight, privacy and solar gain, essential for energy use and guest comfort
- Acoustic performance engineered to meet the demands of a dense central London site, delivering quiet rooms even with high local traffic volumes

Mechanical and electrical systems (efficient by design)

- ~75% heat recovery in AHUs, reclaiming energy that would otherwise be wasted
- Smart BMS with real-time monitoring and alerts for HVAC, lighting and occupancy, preventing drift in performance
- Proprietary guestroom controls developed by HSH's R&D team, including the potential for air-quality sensing and connectivity to fan coil units as well as windows and balcony doors, reducing unnecessary heating/cooling while maintaining superior comfort
- Extensive sub-metering enabling granular management of kitchens, spa, pool and back-of-house energy use

Water and waste efficiency

- Design achieving ~50% improvement in water efficiency credits (Wat 01) while meeting luxury guest expectations. Extensive leak detection systems in concealed cavities identify any problems early
- 100% demolition and 99.5% construction waste diverted from landfill.
- Excavated clay repurposed to create new habitats in the Thames Estuary, reducing disposal impact.

Comfort and wellbeing

- High daylight penetration reduces need for artificial lighting and elevates guest experience
- The specification of low-VOC paints, adhesives, sealants and finishes limits pollutant emissions, reducing off-gassing, and maintaining a healthy internal environment for occupants throughout the building lifecycle
- Indoor environmental quality managed via integrated sensors, maintaining fresh air while minimising energy use
- Staff facilities (including gym, 24/7 canteen, nursing room) designed to unusually high standards, supporting retention and operational reliability

Collaborative delivery

The performance achieved is directly tied to delivery methods:

- More than 30 specialist disciplines were co-located during design and construction to ensure alignment and accelerate decision-making.
- Early contractor involvement reduced redesign risk and protected design intent
- The Peninsula operations teams participated early to align engineering decisions with real operating requirements

This integrated approach ensured that performance was not an aspiration, it was enforced through design, coordination and execution.



How value was built in

Long-term cost stability and reduced operating expenditure

The building's reduced energy demand creates a persistent cost advantage.

- 22% × annual utility bill = avoided cost
- Example: £1.0m utilities → ~£220k avoided cost every year

Because the building is a long-life asset, persistent avoided cost directly improves NOI and materially influences valuation over time.

Lower heating and cooling loads also reduce mechanical plant stress, extending equipment life and reducing maintenance intensity.

Reduced Risks and Lower Repair & Maintenance Costs

Designing for climate resilience significantly reduces exposure to extreme weather events, helping prevent physical damage to the building and minimising operational disruptions. This proactive approach safeguards asset value, ensures business continuity.

Access to Capital Through Green Financing

Certified sustainable buildings strengthen eligibility for financing or refinancing, as banks increasingly prioritise assets with recognised green credentials. HSH has successfully partnered with financial institutions to secure sustainability-linked financing and green loans referencing The Peninsula London's green certification, this has proven to improve access to capital and lowered borrowing costs.

Market Competitiveness and Industry Expectations

The hospitality and real estate sectors are rapidly shifting toward venues with strong sustainability credentials. Properties designed with environmental considerations not only meet evolving regulatory requirements but also align with the corporate goals of luxury retail and business clients. This makes certain guest segments choose hotel for events and retail spaces that are able to deliver on these expectations, enhancing competitiveness and reinforcing brand leadership.

How value was built in

1. Defence against physical climate risk

The Peninsula London reduces exposure to physical climate risk through:

- 50% flood attenuation capacity built into the site design. Including deployable barriers at all below ground entrances
- Durable, washable, moisture-resistant and anti-fungal finishes chosen for long-term degradation resistance. With non-destructive removable wall panels for repair in the on site workshop
- Envelope and systems designed to maintain performance during extreme heat or intense rainfall events
- Green roof and landscaped courtyard areas contributing to stormwater retention and local cooling

These features reduce downtime risk, lower insurance exposure and protect long-term asset value.

2. Defence against transition risk

The asset is also protected from transition risks driven by policy, regulation and market expectations:

- 100% zero-emission electricity eliminates exposure to future carbon-based power tariffs
- >22% improvement in delivered energy reduces risk of failing future performance thresholds
- CRREM trajectory tracking gives lenders visibility on long-term regulatory alignment
- System design allows upgrades as technologies evolve, reducing the risk of obsolescence

3. Embodied carbon considerations

Although formal LCA was not required at the time, the project adopted several measures that reduce embodied impact:

- 100% demolition waste and 99.5% construction waste diversion, unusual for a project of this scale.
- Use of European stone including Portland Stone and Welsh Slate, reconstituted oak and birch veneers, and honeycomb stone panels reduced extraction and transport burdens. Offcuts from stone slabs were repurposed as mosaic flooring
- For the limited number of exotic hardwoods used, the architect, contractor, and client worked closely together to ensure full compliance with the UK Government's Timber Regulations.

These choices indicate forward-thinking material governance even before embodied-carbon requirements became mainstream.

4. Verified, investor-grade data

Performance data is independently assured at group level by KPMG, strengthening its credibility for lenders, insurers, corporate travel clients and ratings agencies.

Assurance reduces underwriting uncertainty and is increasingly a differentiator in sustainable finance.



Outcomes that matter to owners and lenders

METRIC	RESULT	WHY IT MATTERS
BREEAM	Excellent (72.75%)	Verified quality in design and construction
BER vs TER	33 vs 46.7 kgCO ₂ /m ² ·yr (~29% better)	Lower operational emissions + reduced transition risk
Delivered Energy	>22% lower (modelled)	Lower OPEX + higher NOI
Airtightness	2.69 m ³ /h·m ²	Strong envelope = system stability
Heat Recovery	~75%	Lower heating/cooling demand
Water Efficiency	~50% improvement	Reduces cost while maintaining luxury
Electricity	100% zero-emission	Neutralises Scope 2 emissions
Waste Diversion	100% demo; 99.5% construction	Lower embodied impact; disciplined execution
CRREM	Pathway tracked	Supports financing and risk modelling
Data Assurance	KPMG assured	Investor-grade credibility

What others can learn

- Performance must be designed in at concept stage: it cannot be retrofitted economically
- Collaboration is a performance strategy: co-locating 30+ disciplines reduced errors and protected design integrity
- Durability reduces OPEX and capex volatility: materials and finishes matter financially
- Upgrade-readiness is now essential: technology cycles move faster than building cycles
- Verification is now part of value creation: assured data builds lender and buyer confidence
- Luxury and efficiency reinforce each other: daylight, comfort, acoustics and indoor air quality all improve with better design



Closing insight

The Peninsula London shows what is possible when long-term performance is treated as a core investment decision. Its airtight envelope, efficient systems, disciplined construction and verified data provide a level of resilience and cost stability that many assets will struggle to match as regulatory and market expectations increase.

But the market has moved on. Physical climate impacts are intensifying. Disclosure requirements are expanding. Technology cycles are accelerating. And embodied carbon, largely absent from regulation at the time of design, is becoming central to new-build viability and investor expectations.

For boards and investment committees, the takeaway is clear: assets built for the next decade must exceed the standards of the last. Performance must be embedded in architecture, engineered into systems, assured through data, and adaptable enough to accommodate future technologies and climate realities. The Peninsula London set a high benchmark for its time. The next generation of assets must go further - integrating operational efficiency and embodied-carbon strategy at the point of design to create buildings that remain competitive, resilient and valuable across their entire lifecycle.

We would like to thank the contributors to this case study:

The Peninsula London

BREEAM

Arup

Hopkins

Cundall