AESG

Regenerative Retrofit: Transforming London's Commercial Buildings into Thriving Communities

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AESG Director Elisabeth Montgomerie explores how commercial to residential conversions can simultaneously address London's housing crisis, stranded assets and Net Zero targets through innovative design solutions

London stands at a unique crossroads. The capital's commercial property market faces unprecedented challenges as hybrid working patterns leave office buildings underutilised, with Workspace Group reporting its Q1 2025 occupancy falling to **82.2%**[1], creating a growing portfolio of "stranded" assets. Across Europe, office assets and older commercial buildings struggle to attract buyers, as overall commercial property transactions in Q1 2025 reached just €47.8 b — **less than 50% of pre-COVID levels**[2]. Investors increasingly view traditional office stock as at risk of becoming stranded.

Simultaneously, London's housing crisis deepens, with **demand for 88,000 new homes annually**[3] far outstripping supply. The current shortfall relative to output is over 50,000 homes annually, given delivery has been only ~35,000–43,000 units per year[4]. Savills analysis estimates actual need may be closer to 90,000–100,000 homes annually, with only ~37,000 completions seen in 2021/22[5].

Against this backdrop, the race to achieve Net Zero by 2050 intensifies, forcing asset owners to restructure, refurbish, or repurpose buildings and demand innovative solutions that can address multiple challenges simultaneously. The answer lies not in demolition and rebuild, but in regenerative retrofit - transforming existing commercial buildings into thriving residential communities that actively contribute to environmental and social regeneration. This approach offers a pathway to:

- Unlock housing supply
- Revitalise underperforming assets
- Accelerate progress toward UK Net Zero targets
- Creating healthier, more sustainable communities.

Some redevelopment strategies are already underway, such as the Canary Wharf Group's transformation of HSBC Tower into a mixed-use hub (work, cultural, leisure) by 2030 to offset poor office demand[6].

82.2%[1]

occupancy of London's office buildings in Q1 2025 was reported by Workspace Group.

>50%

of pre-COVID levels

overall commercial property transactions in Q1 2025 reached just €47.8 billion.

88,000

new homes

are required annually in London, with demand far outstripping current supply and deepening the housing crisis.

1. https://www.reuters.com/markets/europe/uks-workspace-sees-dip-first-quarter-occupancy-large-clients-exit-2025-07-16/
2. https://www.reuters.com/business/finance/european-real-estate-stuck-zombieland-recovery-proves-elusive-2025-07-17/
3. https://www.bbc.co.uk/news/articles/c1ldgqvypqpo
4. https://www.london.gov.uk/who-we-are/what-london-assembly-does/london-assembly-work/london-assembly-current-investigations/unlocking-housing-development-london
5. https://londonbusinessjournal.co.uk/2021/08/17/double-london-housebuilding-to-tackle-housing-crisis/
6. https://www.businessinsider.com/hsbc-office-redevelopment-london-flexible-working-corporate-real-estate-2024-7

42%

of UK working adults with degrees reported as Hybrid Working, as of early 2025, rising to 49% in the information and communication sectors, and as high as 73% among startups.

2.7
days per week

is now the average in-office attendance in London, up from 2.2 days in 2024.

9.5% & 15%+
Grade A **Grade B**

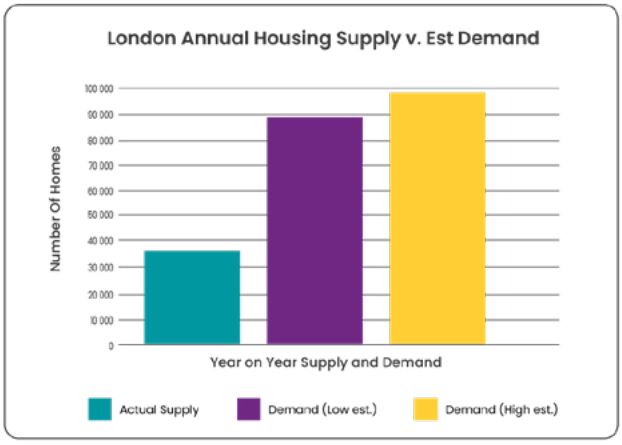
office spaces in London were vacant in Q2 2025.

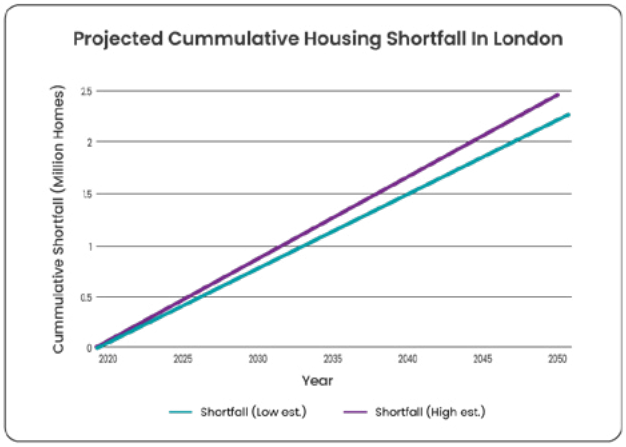
Assets at risk of becoming stranded:

- **Poor energy ratings** (below EPC B) will be unlawful to lease from 2030
- **Inflexible** floorplates not suitable for hybrid work
- **Lack of amenities** demanded in 2025 (daylight access, biophilia, quiet zones, collaboration suites etc.)

>50,000
homes

are lacking each year in London, driving a cumulative deficit projected to reach **1.74 million** by 2050.





The Perfect Storm:
London's Converging Challenges

The post-pandemic shift in working patterns has fundamentally altered London's commercial property landscape. Many office buildings face an uncertain future as ESG requirements tighten and property values decline.

- About **87%** of London's commercial office space is rated **EPC C or below**, making it unlettable by 2030 under the UK's Minimum Energy Efficiency Standards (MEES)[7]
- Cushman & Wakefield estimates that 70% of office stock across major European capitals is at risk of obsolescence by 2030[8], with over half of European real estate portfolio managers acknowledging that **30%** of their assets are already stranded due to poor energy performance[9].
- The West End, Brick Lane, Hammersmith and Canary Wharf each have **over 200 vacant properties**[10].
- Even top-tier ESG-rated space cannot guarantee tenant uptake if usage models change: Meta signed a 20-year lease on a BREEAM Outstanding, EPC 'Excellent' building in 2021 but never occupied it. After failing to sublet for years, it paid £149 m to exit (equivalent to about seven years of rent)[11].

Stranded assets represent both a significant economic challenge and an unprecedented opportunity. London's housing crisis provides the context. The capital needs hundreds of thousands of new homes, yet traditional development faces constraints from high land costs and limited sites. Meanwhile, the embodied carbon implications of demolition are increasingly difficult to justify when retrofit alternatives exist.

The UK's Climate Change Committee emphasises that residential retrofits must increase to **500,000** per year by 2025 and one million annually by 2030 to meet Net Zero targets. London Councils have announced a **£98bn** capital-wide plan to retrofit nearly four million homes to and EPC B rating by 2030.

Commercial to residential retrofit sits at the intersection of these challenges, offering a solution that can simultaneously address housing supply, asset optimisation and climate goals.

500,000
residentials

must be retrofitted annually by 2025, increasing to one million each year by 2030, to align with Net Zero goals.

£98bn

has been allocated by London Councils for a capital-wide plan to retrofit nearly four million homes to an EPC B rating by 2030.

7. https://publications.knightfrank.com/uk-cities-dna/oversupply-obsolesence
8. https://fliphtml5.com/hiyio/wccf/Real_Asset_Insight_December_2024_online
9. https://www.straitstimes.com/business/commercial-properties-are-fast-becoming-stranded-across-europe
10. https://centreforlondon.org/reader/meanwhile-use-london/chapter-three/#empty-commercial-properties
11. https://hrreview.co.uk/hr-news/future-of-work-hr-news/meta-pays-149-million-to-exit-london-office-lease-amid-shift-to-hybrid-work/372623
12. https://www.rics.org/profession-standards/rics-standards-and-guidance/sector-standards/real-estate-standards/retrofit
13. https://www.insidehousing.co.uk/home/london-councils-reveals-98bn-plan-to-retrofit-38-million-homes-72906

1 Triton Square *(British Land)*

Property Week / JLL / Savills estimate that nearly 2 million m² of vacant office space in central London could deliver up to 28,000 residential units if repurposed effectively[14]. Between 2021 and 2023, commercial-to-residential change-of-use applications in England rose by **63%**[15]. However, only **8,000m²** was transacted with conversion intent from 2022 to May 2023, equivalent to roughly **120 homes**[16].

LSH analysis indicates residential values per m² now average about **53% higher than office values** across London. However, construction costs and viability constraints, such as deep floor plates, lack of light, and inadequate MEP infrastructure, reduce the pool of viable assets.

63%[15]

Rise in commercial-to-residential change-of-use applications in England between 2021 and 2023.

8,000 m²
residentials

Transacted with conversion intent from 2022 to May 2023, equivalent to roughly 120 homes[16].

53%
higher

London's residential values per m² now surpass office values on average.

14. https://www.propertyweek.com/insight/homing-in-on-office-conversions
15. https://www.directlinegroup.co.uk/en/news/brand-news/2024/25112024.html
16. https://www.createstreets.com/why-arent-obsolete-london-offices-being-converted-to-housing/
17. https://www.lsh.co.uk/explore/research-and-views/view-points/2024/june/office-to-residential-permitted-development

Confronting the Technical Reality

The conversion of commercial buildings to residential use presents three primary technical obstacles that can make or break project viability. Each challenge requires sophisticated solutions that balance engineering constraints with human needs and regulatory requirements.

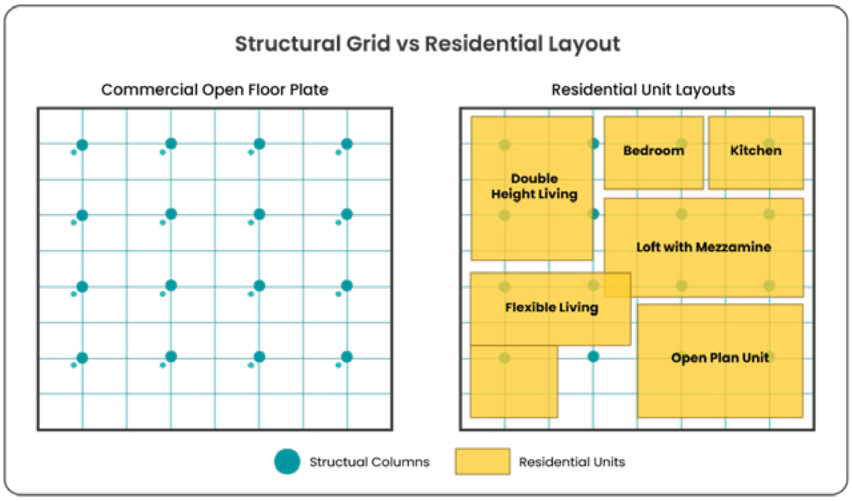
Structural Gymnastics: Reimagining Commercial Grids

Commercial buildings feature large open floor plates with structural grids optimised for office use. These grids rarely align with residential room layouts, creating a fundamental mismatch between existing structure and required function.

The solution lies in embracing hybrid design strategies that work with the existing structure. This might involve:

- Creating double-height living spaces that celebrate generous ceiling heights.
- Designing flexible loft-style apartments
- Incorporating mezzanine levels that maximise space while respecting structural constraints.

Success depends on understanding each building's structural logic and designing layouts that optimise both spatial quality and efficiency.



Building Services Revolution: From Corporate to Comfortable

The most complex challenge involves transforming building services designed for large-scale commercial use into systems providing individual comfort control for residential units. Commercial HVAC, electrical and plumbing networks require complete reimagining.

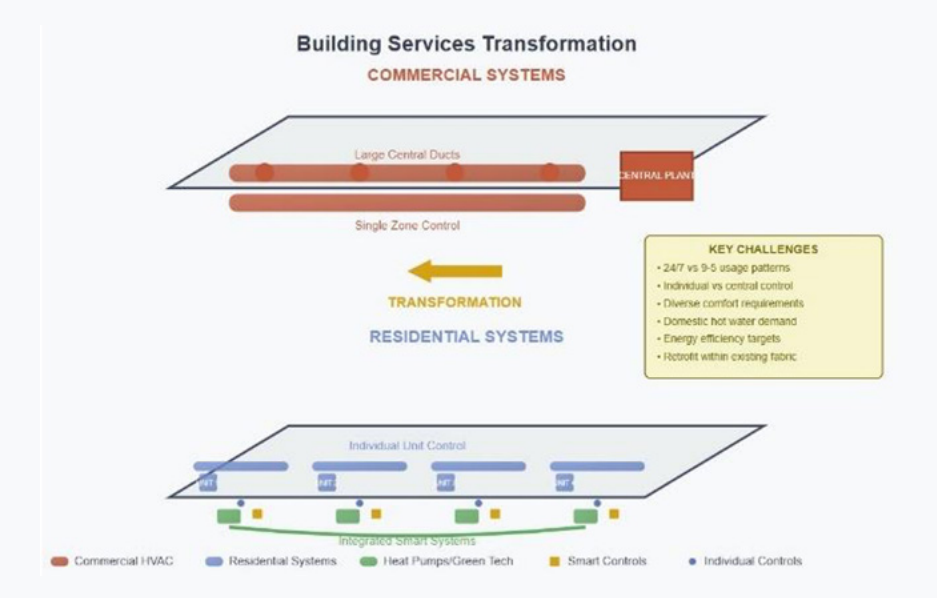
This extends beyond simple downsizing. Residential buildings demand different approaches to climate control, with:

- Individual unit control,
- Diverse usage patterns
- 24/7 occupancy creating new performance requirements.

The challenge is compounded by integrating sustainable technologies like heat pumps and smart controls within existing constraints.

Success requires integrated solutions leveraging existing infrastructure while introducing residential-specific systems. This might involve:

- Dedicated residential service zones,
- District energy systems
- Hybrid approaches combining existing new infrastructure.



Illuminating the Challenge: Rights to Light in Deep Plans

Commercial buildings maximise floor area with deep floor plates relying on artificial lighting. Converting these to residential creates a fundamental challenge: providing adequate natural light while respecting neighbouring rights to light.

This requires sophisticated daylighting strategies beyond simply adding windows. Solutions include:

- Creating internal courtyards bringing light deep into floor plates,
- Implementing light wells serving multiple units
- Designing mixed-use schemes where naturally lit perimeter spaces become residential while internal areas serve ancillary functions.

The regulatory landscape adds complexity, as residential development must satisfy right to light obligations while providing adequate daylight for human wellbeing. This requires detailed daylight modelling, creative architectural solutions and often negotiation with neighbours and planning authorities.

The AESG Advantage:
Integrated Expertise for Complex Challenges

Solving today's technical challenges requires more than individual expertise—it demands interdisciplinary collaboration. AESG uniquely integrates sustainability leadership, façade engineering, acoustics consulting, and fire and life safety to deliver innovative solutions for commercial-to-residential conversions.

Sustainability Leadership
Beyond Net Zero to Regenerative Design

AESG's sustainability team employs a regenerative design approach that goes beyond Net Zero to create buildings that actively contribute to environmental and social regeneration. This philosophy ensures buildings enhance, rather than merely minimise, their impact on environment and community.

In practice, AESG:

- Conducts whole-life carbon assessments to compare retrofit versus rebuild savings
- Applies circular economy principles to maximise reuse and reduce waste
- Enhances biodiversity with green roofs, living walls, and habitat creation.
- Their regenerative design extends to energy performance, delivering energy-positive buildings through renewables, passive strategies, and district energy systems—ensuring compliance today and adaptability for future climate demands.

Fire and Life Safety
Navigating Regulatory Complexity

Converting commercial buildings to residential use presents complex fire and life safety challenges that require specialised expertise. AESG's fire engineering team understands both commercial and residential safety requirements, enabling solutions that meet regulations while supporting design goals.

Navigating the transition between building codes is crucial, as standards often differ in escape routes, compartmentation, and fire protection. These challenges are intensified by existing building constraints and the need to meet current safety standards.

AESG develops integrated solutions through strategic compartmentation, innovative escape design, and tailored fire protection systems with engineering solutions—such as protected corridors, flexible sprinklers, and phased evacuation plans, based on advanced computational modelling suited to building geometry.

The team also coordinates fire safety with mechanical systems, electrical distribution, and sustainable technologies as well as building management system to prevent conflicts and enhance overall performance and optimal building operations.

Façade Engineering
The Building's Environmental and Performance Interface

Building façades are the critical interface between interior comfort and the external environment, making façade engineering vital to commercial-to-residential conversion. AESG's façade team transforms commercial envelopes to deliver residential performance, comfort, and character.

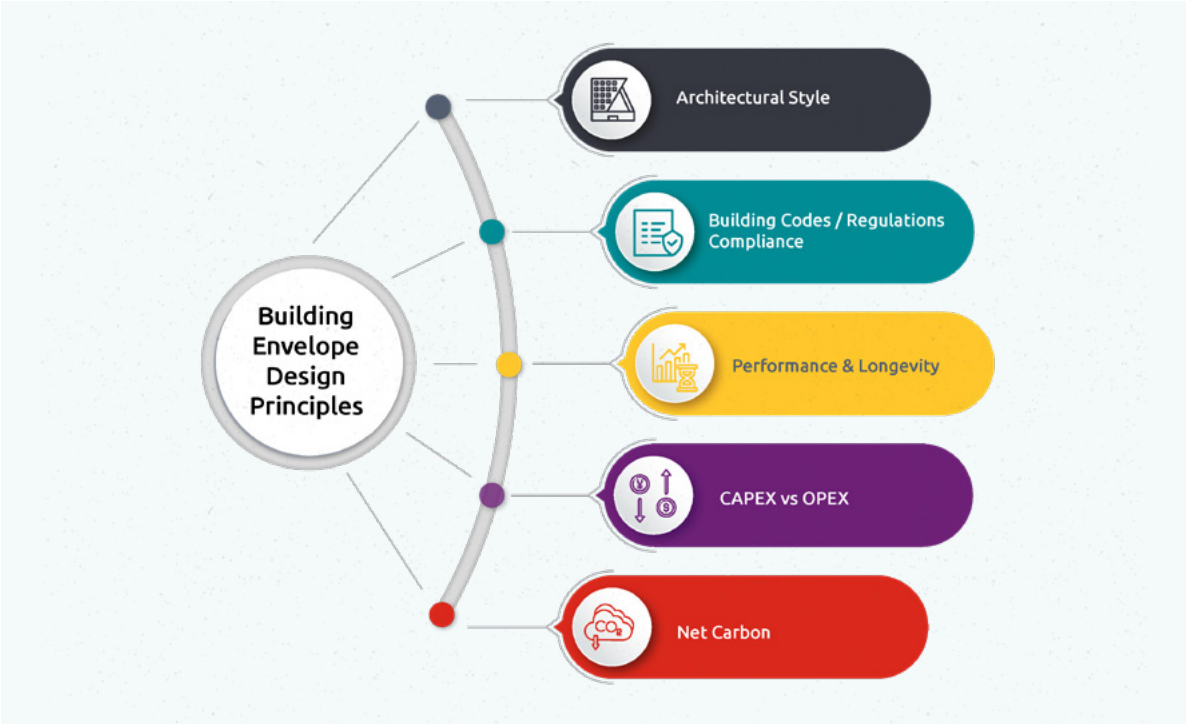
Commercial façades often fall short on residential performance requirements. AESG conducts detailed fabric analysis – covering thermal bridging, airtightness and condensation control – ensuring comfort and energy efficiency.

Retrofitting façades requires navigating complex challenges:

- **Regulatory Compliance**
  Alignment with residential building regulations (fire safety, thermal performance, ventilation)
- **Heritage & Planning**
  Sensitive adaptation where conservation requirements apply
- **Construction Phasing**
  Solutions minimising disruption during refurbishment

AESG helps clients unlock enhanced asset value, improved sustainability credentials, and market-ready residential spaces.

Acoustic performance is crucial for quiet residential environments despite urban noise. AESG integrates noise control with daylight, ventilation and views. The team optimises daylight and energy performance through adaptive façade systems, incorporating external shading, high-performance glazing, and advanced daylighting technologies.



Creating Regenerative Communities:
Design for Human Flourishing

The success of commercial-to-residential conversions lies not only in technical achievement but in creating communities where people thrive. This requires a human-centred approach that integrates wellbeing, indoor environmental quality, and social infrastructure alongside building performance.

Social Infrastructure: Building Community

Residential conversion goes beyond creating individual units—it's about fostering social connections and building supportive infrastructure. This means designing shared spaces that serve diverse needs, encourage interaction, and accommodate residents of all ages and abilities.

These spaces should be flexible and adaptable, serving multiple purposes throughout the day. Examples include:


Coworking areas for hybrid work


Fitness spaces promoting active lifestyles


Outdoor areas for gardening and social engagement

Circulation design is especially important in converted commercial buildings, where long corridors and large floor plates can feel institutional. AESG's sustainability strategies foster informal social interaction while ensuring privacy and security for residents.

Indoor Environmental Quality: Supporting Wellbeing

Healthy indoor environments depend on air quality, thermal comfort, acoustics, and lighting—all vital to wellbeing and environmental performance.

- Air quality starts with low-emission materials and is enhanced through mechanical ventilation with heat recovery, natural ventilation, and real-time monitoring systems.
- Thermal comfort is addressed by designing zoned climate control systems that offer unit-level control while leveraging the thermal mass of existing concrete structures to maintain stability and efficiency.
- Acoustic performance must meet residential standards, managing both external noise and internal sound from adjacent units and building systems. AESG's acoustic designs maintain natural ventilation and architectural character while reducing noise.

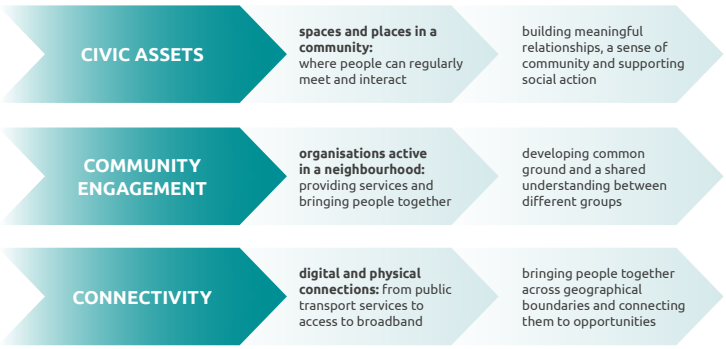
Biophilic Design: Reconnecting with Nature

Biophilic design enhances wellbeing and sustainability by restoring connection with nature. In commercial-to-residential conversions, this involves maximising natural ventilation, integrating living systems, and strengthening ties to the outdoors.

Deep-plan buildings benefit from strategies like:

- Stack effect ventilation, Cross-ventilation
- Thermal mass to reduce reliance on mechanical systems while maintaining air quality.

Green infrastructure—living walls, rooftop gardens, and courtyards—supports biodiversity, manages stormwater, improves air quality, and creates engaging social spaces. These features transform buildings from isolated units into vibrant, healthy ecosystems for both people and the environment.



Economic, Programme and Social Impact: Quantifying Success

The success of commercial to residential conversion must be measured across economic viability, programme efficiency and community impact. With the UK's Seventh Carbon Budget (2038–2042) setting a 75% emissions reduction target by 2040 and the largest share of emissions reduction coming from switching to low-carbon electric technologies across buildings, understanding the full lifecycle costs and benefits of conversion becomes critical to delivering both financial returns and climate objectives.

Financial Viability: The Economics of Regenerative Retrofit

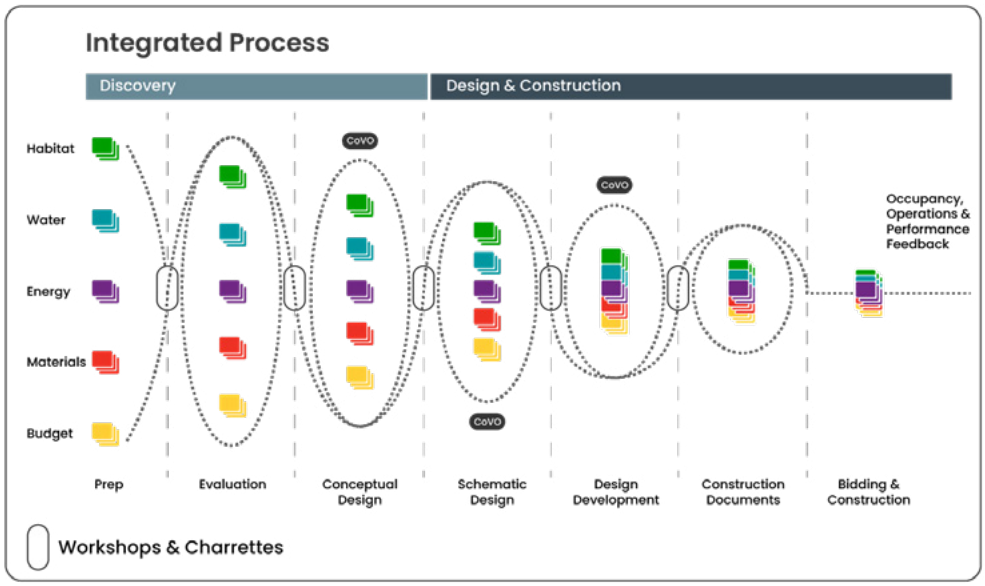
Regenerative retrofit offers compelling economic advantages over demolition and rebuild:

- Avoiding substantial demolition, waste disposal and site preparation costs
- While utilising existing structural infrastructure.
- The Seventh Carbon Budget confirms that net zero is achievable and affordable, with operational savings offering net benefits over capital investments by 2040, making retrofit economics increasingly attractive.

AESG's integrated approach enables accurate cost modelling across building systems and performance requirements, including façade strategies, sustainable technologies and high-performance design. The economic analysis extends to operating costs, where energy-efficient design delivers substantial lifecycle savings as energy costs rise and carbon pricing makes inefficient buildings economically unviable.

Programme Impact: Accelerating Delivery Through Integrated Design

Traditional sequential design methods often create interface conflicts requiring extensive coordination and rework. AESG's integrated design methodology addresses these challenges through early collaboration between sustainability, façade, fire and life safety and building services specialists, identifying conflicts during concept design when changes have minimal programme impact.



The programme benefits extend to construction, where detailed coordination reduces technical delays through comprehensive installation sequences and trade coordination. For developers, this translates to:

- Reduced holding costs,
- Earlier revenue generation
- Lower construction financing.

The integrated approach typically delivers 15-20% programme savings compared to traditional methods while reducing cost overrun risks.

Social Equity: Ensuring Inclusive Development

Regenerative retrofit creates opportunities for diverse, inclusive communities by serving residents across different income levels, ages and abilities. The challenge lies in balancing financial viability with social objectives through innovative financing, social housing partnerships or phased development creating cross-subsidies.

AESG works with developers to ensure converted buildings contribute to neighbourhood vitality rather than displacement, analysing impacts on local services, transportation and community facilities.

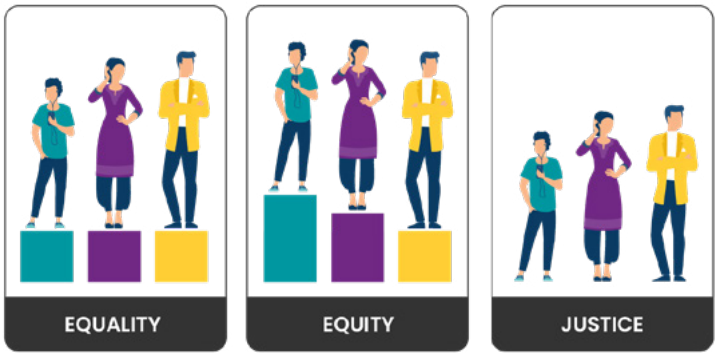


Figure 4.2 Additional capital expenditure in the Balanced Pathway, compared to the baseline

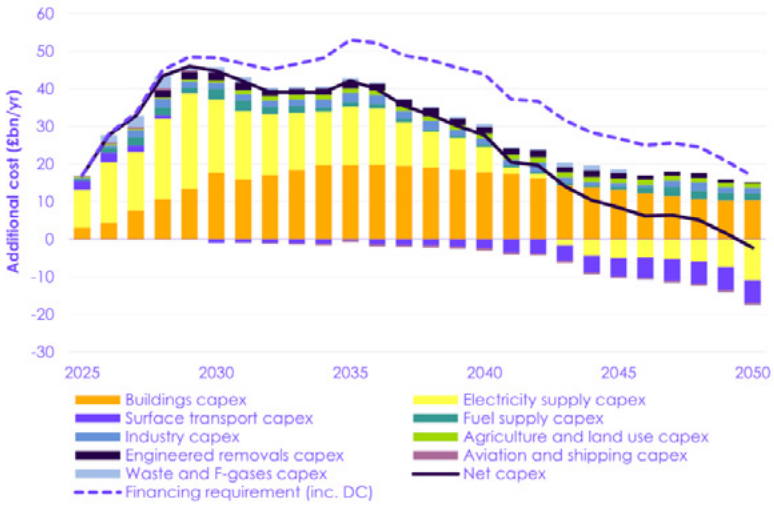


Image credit: https://www.theccc.org.uk/publication/the-seventh-carbon-budget/

The Path Forward:
Scaling Regenerative Solutions

The transformation of London's commercial building stock represents more than individual project success - it requires scalable approaches that can be replicated across the capital's diverse building portfolio. This demands continued innovation in design approaches, construction methods and regulatory frameworks.

Modern Methods of Construction: Accelerating Retrofit Delivery

Commercial to residential conversion creates opportunities for modern methods of construction (MMC) that accelerate delivery while improving quality. AESG's expertise enables strategic MMC application within existing building constraints.

- Prefabricated bathroom and kitchen pods are the most promising MMC application. These modules are manufactured off-site while site preparation proceeds, reducing construction time and improving quality control. The approach leverages economies of scale while accommodating existing building geometries.

- Modular façade systems enable envelope transformation through prefabricated panels integrating insulation, glazing and environmental controls, delivering consistent thermal performance.

- Digital manufacturing technologies, including BIM and computer-controlled fabrication, enable mass customisation for unique retrofit requirements while maintaining flexibility for existing constraints.

Programme benefits are substantial, typically reducing construction time by 25-40% while improving quality. For developers, this means reduced financing costs and earlier revenue generation.

Technology Integration: The Smart Building Revolution

Smart building technologies offer unprecedented opportunities to optimise performance, enhance comfort and enable continuous improvement through building management systems, air quality monitoring and occupant feedback systems.

AESG's human-centred approach ensures smart systems enhance rather than complicate occupant experience, requiring careful technology selection that provides real benefits while remaining accessible to users with different capabilities.

Digital twin technology enables continuous performance optimisation, allowing operators to test scenarios for changing conditions. This becomes particularly valuable in converted commercial buildings where complex system interactions require ongoing fine-tuning.

Image credit: https://www.autodesk.com/design-make/articles/digital-twin-examples

Policy and Regulatory Innovation

Successful scaling of commercial to residential conversion requires supportive policy frameworks that recognise the unique challenges and opportunities of retrofit projects. This includes planning policies that facilitate beneficial conversions, building regulations that support innovative design approaches and financing mechanisms that reward sustainable development.

The latest Home Builders Federation survey saw 88% of developers cite planning delays as a major constraint on delivery, representing a near-record high. This indicates that planning delays remain a systemic issue across all development types. Pertmitted Development Rights (PDR) amendments (March 2024) are expected to accelerate approvals by expanding eligibility for the streamlined 56-day process for Class MA conversion (commercial, business and service uses to dwellinghouses) without needing full planning permission, however, we won't see the data on the impact of the PDR amendments until 2025-2026 reporting cycles.

AESG engages with policy development, sharing project lessons to inform regulatory frameworks and advocating for performance-based regulations that enable innovation while maintaining standards. The regulatory landscape evolves with new requirements for whole life carbon assessment and building performance monitoring. AESG stays at the forefront, ensuring projects meet current requirements and anticipate future developments.

Conclusion:
Building London's Regenerative Future

The conversion of London's commercial building stock into thriving residential communities represents one of the most significant opportunities to address the capital's housing crisis while accelerating progress toward Net Zero targets. However, realising this potential requires more than good intentions - it demands sophisticated technical expertise, innovative design approaches and deep commitment to human wellbeing.

AESG's integrated approach to regenerative retrofit provides the foundation for transforming complex technical challenges into opportunities for innovation. By combining sustainability leadership, façade engineering excellence and fire and life safety expertise, AESG enables developers and architects to deliver projects that not only meet immediate housing needs but create lasting value for communities and the environment.

The success of individual projects depends on understanding each building's unique characteristics and constraints while applying proven design principles and innovative solutions. This requires collaborative partnerships between developers, architects, engineers and communities, working together to create buildings that serve both current needs and future aspirations.

The time for incremental change has passed. London's future depends on bold, innovative approaches that transform the built environment into a force for regeneration. Commercial to residential conversion offers a pathway to this future, but only if we embrace the complexity of the challenge and commit to delivering solutions that truly serve human and environmental wellbeing.

The buildings we create today will shape London's communities for generations to come. By choosing regenerative retrofit over demolition and rebuild, we can create a legacy of sustainable, healthy and thriving communities that contribute positively to the capital's future. The expertise exists, the opportunity is clear and the need is urgent. The question is not whether we can transform London's commercial buildings into regenerative communities, but whether we will seize this moment to do so.

For more information about AESG's integrated approach to commercial to residential conversion, including our capabilities in sustainability, façade engineering and fire and life safety, contact our team to discuss how we can help deliver your regenerative retrofit vision.

How AESG can help

How AESG can help

AESG is an international Consultancy, Engineering and Advisory firm committed to driving sustainability in the built environment and beyond. With the highest calibre leadership team in our field, we pair technical knowledge with practical experience to provide hands-on, bespoke strategic solutions to our clients.

We have one of the largest dedicated specialist consultancy teams working on projects within the building, urban planning, infrastructure and strategic advisory sectors. With decades of cumulative experience, our team offers specialist expertise in sustainable design, building services, MEPF, fire and life safety, façade engineering, commissioning, digital delivery, waste management, environmental consultancy, strategy and advisory, security consultancy, cost management and acoustics. Our prestigious portfolio demonstrates our extensive capabilities and our ability to consistently deliver best in class solutions to some of the industry's most complex technical challenges.

How AESG can help

Elisabeth Montgomerie

Director of Sustainability, AESG UK

Elisabeth Montgomerie joins AESG as Director of Sustainability, UK. Elisabeth is an experienced sustainability leader with a proven track record of transforming sustainability practices and driving impactful purpose-led projects. she has developed and implemented sustainability strategies and tools, significantly enhancing my practices' environmental impact. She is passionate about leading responsible business practices, fostering professional development, and delivering measurable sustainability outcomes. Her goal is to create transformative impact and achieving commercial objectives through sustainable and innovative solutions.

For further information relating to specialist consultancy engineering services, feel free to contact us directly via info@aesg.com

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