

An aerial photograph of a city, likely Glasgow, Scotland, showing a dense urban landscape with a river (the Clyde) winding through it. The city features a mix of traditional brick buildings and modern high-rise structures. A prominent church spire is visible in the center. The river flows from the top left towards the bottom right, with several bridges crossing it. The sky is clear and blue.

Building Competence and Capability

The case for a Public Sector
Research Establishment for
the built environment

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the Edge is a built and natural environment think tank and network. It is multi-disciplinary in a landscape remarkable for its abundance of single-discipline institutions. Started as a means of creating a shared space between the architectural and engineering institutions, the Edge is a voluntary group with no staff and multiple stakeholders across the built and natural environment professions. We encourage cross-disciplinary debate and campaign for change that will improve outcomes for society.

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1. Introduction

PSREs are a diverse collection of public bodies carrying out research. This research supports a wide range of government objectives, including informing policy making, statutory and regulatory functions and providing a national strategic resource in key areas of scientific research. They can also provide emergency response services. They interact with businesses around a wide array of innovation-related functions.

Cabinet Office (2019) ⁱ

This is a call for action to create an independent, authoritative Public Sector Research Establishment (PSRE) for the built environment. ⁱⁱ This would help (central and local) government and industry to improve the quality, productivity and social value of the built environment through knowledge creation and knowledge transfer. It would also increase construction industry capabilities, foster innovation and reduce risk. We must grasp the political opportunity to tackle major issues of public health, social inclusion, climate change, safety and wellbeing in tandem with fostering economic growth and productivity and export potential.

The built and natural environment underpins the UK's prosperity and quality of life. The built environment is also one of the UK's principal assets and the platform where most economic and social activities occur. However, poor building performance is costing private and public sector owners billions a year in lost efficiencies and waste and through the direct expense of dealing with health problems and safety hazards. ⁱⁱⁱ The UK has lost out on opportunities to improve its economic impact and enhance productivity due to the state of its buildings and cities. The country urgently needs better buildings, towns and open spaces if it is to thrive and compete in the modern world.

Significant gaps now exist in the required knowledge and guidance to adequately regulate, create and maintain the built environment. Representing in excess of 20% of national GDP the joint construction and property industry^{iv} is a major part of the UK economy. However, built environment research is significantly under-funded. Only 0.8% of public research funding into universities is devoted to the built environment (not including engineering): £50m out of £6.27bn p.a. – according to Research Excellence Framework 2015-20 figures. Given its indispensable nature for the State and the wider public, a reasonable amount of public research funding for the built environment would be at least 10% of the research budget.

A PSRE can support vital public interests – by providing evidence and guidance for policymaking and regulation. The critical nature of the knowledge gap for policymakers was made clear during Covid when SAGE lacked an understanding of the role of the built environment in transmission and the trade-offs between the economy and health. Other examples include the major task of decarbonising the existing building stock, a lack of independent evidence on the new use of mass timber in buildings, validation for re-use of building components to facilitate the circular economy and the measurement of performance of buildings in use.

Long-term, big picture and crosscutting research is needed on vital national issues (e.g. national resources, land use, infrastructure, housing provision, new settlements, alternative heating systems, climate adaptation). These issues cross many different disciplinary boundaries and scales (planning, design, operation, finance, social issues, etc).

Although universities provide research capability, there is a need for specific services targeted at government, industry and society: involving the creation and maintenance of long-term knowledge, policy / regulatory advice, investigatory capacity and knowledge transfer. State sponsored built environment research bodies offering these services are standard across other countries in the G7.

There are also PSREs in other sectors in the UK that provide equivalent essential inputs to government, industry and society, for example the National Institute of Health and Care Excellence (NICE), the National Physical Laboratory and the Health and Safety Executive.

2. The challenge

The critical need for industry engagement and for a more comprehensive and coherent body of knowledge reinforces the vital importance of Government continuing to engage, at the right level and in a practical way beyond the role of legislator and regulator, in the programmed development of the knowledge, skills and tools by which building safety will be more securely delivered.

Morrell and Day (2023)^v

As the quality of the UK's built environment falls behind those of comparable OECD economies and elsewhere, the lack of robust, independent information and advice is working against the achievement of successful outcomes in many areas including:

- the shortage and quality of housing
- social inequalities and vulnerabilities
- health and wellbeing
- social value
- efficiency and productivity
- economic growth and export potential
- building safety
- adaptation of the built environment to a changing climate
- net-zero and energy security
- resource availability / scarcity
- risk reduction and resilience
- durability, robustness and adaptability
- whole life financial costs and benefits of a facility
- harnessing emerging technologies
- biodiversity

A nationally based approach to knowledge creation, validation and curation, with a clear dissemination strategy, is essential for improving capabilities in the construction and property industries and for effective public policymaking. Only an organisation with the status and adequate resources of a Public Sector Research Establishment can achieve this.

Box 1 – Why government now needs a built environment PSRE

The incoming government faces a challenge: the need for new homes, energy, transport and green infrastructure pitched against the biodiversity and climate emergencies. These conflicting demands must be resolved fast and affordably - time and money are short.

Effective resolution needs knowledge and expertise, plus capacity to manage complex projects across a wide range of disciplines and domains: architecture, landscape and urban design, town and country planning, infrastructure provision, development economics, construction, engineering, ecology and conservation.

Challenges on this scale can only be met by partnerships between national and local government, communities and the private sector. House builders can't build without infrastructure, nor assemble sites for New Towns. Alone, they can't deliver the scale of placemaking and environmental measures needed to meet the nation's aspirations and needs.

But there is a problem. Public bodies must be intelligent clients, proactive conveners of cross-sector agencies, active agents of change, and inventive and creative facilitators. They need well-founded information, often at the leading edge of knowledge.

Yet where can they get the intelligence and skills? In 1997, the Building Research Establishment was privatised. From 2010, further capacity was lost by abolishing Regional Development Agencies, Housing Market Renewal and Growth Area Partnerships and halving Local Authority planning department budgets.

The private sector has been called on to fill some of the gaps but, by nature, it must be mainly reactive and has to make a profit. While many

companies aim to be public spirited, they have to balance that with financial viability. As the systemic failure at Grenfell shows, over-reliance on private sector assurances without adequate public interest oversight can go disastrously wrong.

The loss of public interest capacity and expertise, and experiences of letting public-private relationship become unbalanced should teach us that we need trustworthy sources of advice and data. Public bodies must be focused on informing those charged with planning and delivering infrastructure and development, and on rebuilding skills and capacity.

Given the nature of the challenges, public clients and agencies must be empowered to explore innovative and experimental solutions, making recommendations based on objective evidence rather than a balance sheet. This applies to what we build and protect, but also to how we choose to achieve these goals. For example, and according to the Royal Institution of Chartered Surveyors, valuing natural capital and Biodiversity Net Gain are unsolved problems. As they are public goods, it is unreasonable to expect the private sector to solve this kind of conundrum alone.

What conclusions can we draw? Past governments haven't been afraid to set up public interest research and advisory bodies. The Royal Fine Art Commission and Office for Place under the Conservatives, BRE under a coalition, CABE under Labour. The scale of the challenge is now, in many ways, greater than any those bodies faced. The need is similar but the countervailing threats from a heating climate and biodiversity collapse are existential. If ever there was a time for government to step up to the plate and commit its resources to the partnership by creating a public interest research and intelligence institution, it is now.

4. The state of play and potential for research

The condition of the UK's building stock and wider built environment (infrastructure, open space etc.) continues to deteriorate, raising significant concern especially in the face of a rapidly changing climate and other risks including fire, fuel poverty, overheating, flooding, mould growth, infestation and internal air quality, alongside depletion of and ready access to nature.

Given limited available resources for remedial action to deal with these issues it is vital that there is a high quality knowledge and evidence-base that both captures the extent and location of problems along with effective means of dealing with them to reliably deliver long-term success.

Overall improvement and the ability to successfully respond to disruptive change will depend on rapidly sharing knowledge, development of appropriate standards and regulation and enforcement throughout a building's, or the wider environment's, lifecycle - from planning and briefing through design, construction and handover, into operation, maintenance and alteration, to eventual recycling and end of use.

An independent centre of expertise represents the most cost-effective way of creating, curating and disseminating robust evidence for improving the cradle-to-grave performance of the built environment and providing impartial, authoritative advice for public policies, standards and industry practices.

3. The role of a National Built Environment Research Organisation (NBERO)

The UK Government requires PSRE's should fulfil objectives in:

1. Development and exploitation of new technologies and knowledge assets
2. Policy-making and regulatory support to government
3. Operational science services to government, business, building users / occupiers and society.^{vi}

As a PSRE, a National Built Environment Research Organisation (NBERO) would work across all of these; covering the planning, use, operation, performance and long-term stewardship over the whole-life of facilities. This would include buildings, landscapes, land use and settlements with a far-reaching range of performance issues, including: public health, wellbeing, safety, durability & robustness, social value and social impacts, energy demand and use, climate mitigation and adaptation and impacts on resources and the natural environment.

The research and knowledge base of an NBERO would encompass social, planning, economic and spatial concerns, responding to the collective aspects of the built environment as a public asset and concern (even when parts of it are in private ownership). Its responsibilities would include the central task of providing clear, authoritative long-term guidance to government for adapting the existing building stock to a changing climate - as required to support the effective implementation of the UK's National Adaptation Programme.^{vii}

Box 2 – What would be the NBERO's remit?

- Advise government to support policy, strategy and regulation; assist with tackling urgent questions as they emerge.
- Disseminate knowledge to industry; knowledge translation and transfer.
- Guidance to building owners, occupiers, facility operators and the general public.
- Long-term, big picture and cross-cutting research on vital national issues (planning and cities)
- Future studies, preparing options for change (e.g. public health, the impact of AI & sensors)
- Data collection and analysis of the built environment (e.g. building performance, building failure investigation, settlements) including risk assessments.
- Identify significant gaps in research and knowledge.
- Inhouse research and the commissioning external research.
- Technical research into materials, components and systems.
- Certification of components
- Industry innovation: validating and implementing new products and services
- Research and expertise on large systems: land use, energy and heating systems, urban heat islands
- Independent oversight of the methods, reliability and validation processes for tests and procedures to assess components, systems and buildings.
- Coordinate the many UK organisations involved in built environment research

Specific tasks that an NBERO would undertake may include:

- Knowledge curation & management
- Knowledge transfer (targeted dissemination)
- Data management
- Providing speed of response
- Quality assurance and myth busting
- Building performance studies
- Long-term cohort studies
- Systematic reviews – e.g. akin to the Cochrane Library
- Systems thinking and systems solutions
- Oversight of emerging technologies e.g. AI systems for the built environment
- Studying links between built and natural environment and health

6. The research landscape

Britain had the world's first national building research organisation funded by government, the Building Research Station. It later became the Building Research Establishment (BRE) and was privatised in 1997. The intended remit in 1997 was for the BRE "to continue to provide independent and impartial advice and research findings",^{viii} but following its new status and with a need to generate profit that remit changed. BRE no longer has a role as an advisor to government on policy and practices, nor has it the funding to widely disseminate best practices to the construction industry or a responsibility to maintain expertise in all areas that government, industry and society require.

Much has changed in the funding of construction research over the past quarter century. BRE's annual revenue in 2021 was less than two thirds (63%) of its equivalent revenue in 1995, with only 12.7% identified as coming from government sources. Alongside this substantial income decline it has moved from being government funded to a reliance on servicing private industry with short-term funding and all the possible risks that accrue from that.

In its place are a wide variety of research bodies in the public, private and voluntary sectors; including universities, commercial companies, civic society organisations and campaigning bodies; with a considerable overlap between different parties and complex and potentially compromising funding arrangements. Their activities and resources are partly co-ordinated by UKRI, but only to a very limited extent. The remit of these bodies does not include several essential services: knowledge translation and transfer, advice to government or other public sector bodies, authoritative guidance to the wider industry, or providing long-term repositories and dissemination of specialist knowledge.

This has left the construction and property industry without the reliable and up to date knowledge and guidance it needs if it is to deliver on the nation's requirements and in the long-term public interest.

5. Funding

Core funding for an NBERO should come from public sources in order to ensure that it is an independent and authoritative source of information and free of corporate influence and concealment. Much of this will come from the redirection of existing funding, currently sitting in multiple different pots, along with an uplift in general research investment resulting from the Government Research Commitment and, in particular, the Construction Sector Deal.

On the other side of the equation considerable benefit will accrue to the UK from a better performing built environment, improved productivity and a healthier and happier population. There should also be significant savings from avoidance of both major and minor tragedies. The Grenfell Tower disaster of 2017, in particular, has led to very high levels of public expenditure. The government's estimate for replacing flammable cladding in residential buildings over 18 m high is £5.1 billion, with lower-rise and non-domestic buildings not included. Each and every damaged or shortened life, poorly performing building or element of infrastructure has a public cost and the final cost to government, developers, owners and occupiers is likely to be much higher. In contrast, a built environment that works well reduces energy use, environmental pollution and maintenance expenditure, while improving personal and social outcomes.

9. Conclusion

The planning, construction, operation and use, maintenance and refurbishment, change of use and demolition of the built environment is a public issue. The built environment is a major long-term national asset and a critical factor in our collective productivity, health and safety, wellbeing, cultural vitality and heritage, and use of limited resources.

Well coordinated research and knowledge transfer represents an important and cost-effective opportunity to improve the whole-life performance and resilience of the built environment and the construction industry. It reduces risk to the supply side, to government and to property owners by the early identification and avoidance of potential problems, ensures robust implementation of new / innovative technologies and sound practice and improves the economic performance and social value of the built environment.

the Edge calls for a public discussion leading to the creation of an independent and properly-funded National Built Environment Research Organisation (NBERO) with Public Sector Research Establishment (PSRE) status that invests in, maintains and disseminates knowledge and guidance to secure the value of the built environment that the country urgently needs for its future health and prosperity.

7. Key recommendations

- A. The UK must increase its annual investment in built environment research aimed at improving the stewardship and performance of the built environment across social, environmental and economic issues.
- B. The UK nations and regions should collectively found an independent National Built Environment Research Organisation (NBERO) with Public Sector Research Establishment status to both bring together existing and new areas of research.
- C. This organisation should principally identify, curate and co-ordinate research needs and provide much-needed continuity of expertise. It should create, maintain and disseminate robust, independent and authoritative research and advice to different stakeholders: government, industry and civil society in forms tailored to their specific needs.
- D. Key areas of concern should be the health, safety and wellbeing of the population alongside tackling the climate and biodiversity emergencies

8. Key questions for further discussion

1. What organisational form should the NBERO take?
2. Could an existing organisation be re-purposed to become an NBERO?
3. How can political consensus be created to maintain long-term support and continuity?
4. What are the funding options for ensuring the long-term viability of an NBERO?

Endnotes:

- i. https://assets.publishing.service.gov.uk/media/5ce2bd47e5274a4bf48201ad/Tailored_Review_Guidance_on_public_bodies_May-2019.pdf
- ii. A Public Sector Research Establishment (PSRE) is one that is eligible or potentially eligible for funding by a UK government department or UKRI, has research and development capacity and has met specific stated criteria. The phrase 'built environment' covers, as in the British Standard definition, the 'collection of human-made or induced physical objects located in a particular area or region' and, when 'treated as a whole, typically is taken to include buildings, external works (landscaped areas), infrastructure, and the products of construction works within the area under consideration'.
- iii. For example, poor quality of the building stock with structural collapses, premature demolitions, leaking and flooding, fire and toxicity. The parlous state of the built environment hits the news headlines every week, with issues of unsafe cladding in dwellings, dangerous concrete in schools and hospitals; and the general lack of maintenance to public buildings, and shoddy new ones.
- iv. House of Commons library, Industries in the UK, October 2023 - <https://commonslibrary.parliament.uk/research-briefings/cbp-8353/>
- v. Morrell, P. & Day, A. (2013). Testing for a safer future: independent review of construction product testing regime. London: Department for Leveling Up, Housing and Communities. <https://www.gov.uk/government/publications/independent-review-of-the-construction-product-testing-regime/introduction-and-executive-summary>
- vi. Government Office for Science (2022), Guidance on assessing performance and value of Public Sector Research Establishments. <https://www.gov.uk/government/publications/public-sector-research-establishment-value-framework/guidance-on-assessing-performance-and-value-of-public-sector-research-establishments>
- vii. Department for Environment, Food & Rural Affairs, Environment Agency and Met Office. (2023) Government sets out adaptation programme to tackle climate impact. <https://www.gov.uk/government/news/government-sets-out-adaptation-programme-to-tackle-climate-impact>
- viii. Courtney, R. (1997). Building Research Establishment: past, present and future. *Building Research and Information*, 25(5), 285-291. <https://doi.org/10.1080/096132197370264>, p.289