

Unlocking the potential of Public Sector Research Establishments

CaSE represents and champions all parts of the UK's research and innovation system. Key to our work is finding ways to improve the interactions and collaborations across the system, helping to make the whole greater than the sum of its parts. During the past year, CaSE has spoken to over 30 public sector research establishments (PSREs) to better understand the important role they play in the research ecosystem and how the government and science sector can unlock their full potential.

What are PSREs?

PSREs are a group of around 50 public research bodies, which are attached to a relevant government department with whom they have a long-term funding arrangement. Research Council Institutes (RCIs) are slightly different in that they instead share an association with one of the UKRI Research Councils. This briefing focuses on PSREs and RCIs but uses PSREs to refer to both.

PSREs are part of a large and diverse family of public and non-profit research organisations, which also includes Independent Research Organisations, Catapults, and private non-profit research organisations. The Royal Society's explainer¹ provides a detailed breakdown of the full range of public and non-profit research organisations.

Our recommendations

The government and wider sector should take steps to improve their understanding of PSREs and move from seeing them as service providers to strategic partners:

- 1 PSREs need more sustainable funding, including longer-term government budgets.
- 2 The cross-government Science & Technology strategy should lead a step-change in approach to the governance of PSREs.
- 3 Partnerships should be strengthened between PSREs and policy teams across government, industry, and academia.

Understanding the role of PSREs

The diversity and breadth of PSREs, coupled with a general lack of awareness, means that defining PSREs as a collective is not always easy. In 2019, the Government Office for Science's (GO-Science) Review of Government Science Capability² provided the following definition:

“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.”

These points were all raised during our conversations with PSREs, reinforcing that they serve a wide range of functions that extend far beyond their research output. In addition to the above, we also heard that PSREs play an important role supporting local innovation clusters and de-risking private sector investment in early-stage technologies. In the US, consistent investment in government laboratories has demonstrated the potential of the PSRE model, with their labs playing a critical role in driving the rapid technological advancement during the 90's, including the 'boom of the internet'. PSREs can have a similar impact in the UK, and support the government's ambitions to become a "science superpower" and level-up the nation.

No two PSREs are the same

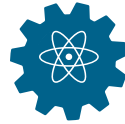
However, no two PSREs are the same, with points of divergence often relating to their size, funding level, operating models, and relationship with wider R&D actors. Their research area is also a key point of difference, with each PSRE having its own distinctive focus. These can vary enormously, from the provision of world-class measurement capabilities for financial services (National Physical Laboratory), to research on the effects of aging and disease (Babraham Institute).

PSREs have a variety of funding models. All PSREs receive government funding, with RCIs receiving grants from research councils, and PSREs from government departments, either as a grant or through a contract for services. These grants and contracts are often short-term. To supplement this funding, many PSREs also receive substantial (25%+), but varied, levels of non-public funding and competitively won research grants. However, we heard some PSREs face limitations on the UKRI grants they can apply for, with restrictions based on the capabilities of the PSRE.

Examples of PSREs

To illustrate the breadth of PSREs and the research they do, we provide three examples below.

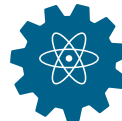
Atomic Weapons Establishment



AWE is a Non-Departmental Public Body working in partnership with the Ministry of Defence (MoD). AWE is unique in that in addition to applied research, it is also one of the only PSREs to have major manufacturing and production facilities, providing the warheads for the UK's nuclear deterrent. This is vastly different to the research focused organisations that typify the group, and necessitates a greater scale, with AWE employing over 6500 people across its sites.

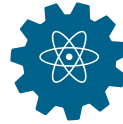
AWE demonstrates how different public and non-profit organisations can be. It is crucial to consider each individually when considering their strategic role in achieving government goals or societal benefit – there is no “one-size fits all” approach.

UK Centre for Ecology & Hydrology



UKCEH is a former research institute for UKRI's Natural Environment Research Council (NERC). Now an independent, not-for-profit research institute, established as a company limited by guarantee with charitable status, it is a strategic delivery partner for NERC, receiving its funding from competitively won grants, contracts, and funding from NERC. UKCEH seeks to understand the environment, how it sustains life, and the human impact on it. The institute has sites in England, Wales, and Scotland, working both nationally and internationally.

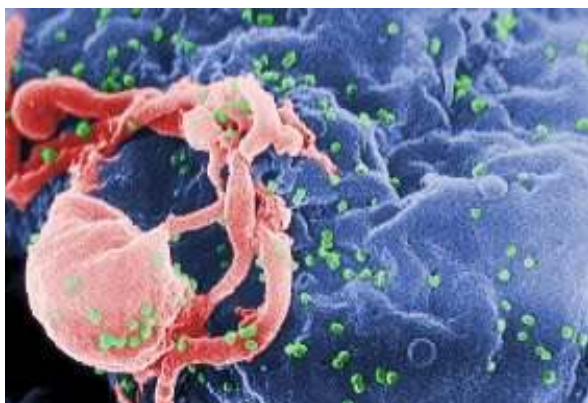
NERC funding for UKCEH includes 'National Capability' - it provides services accessible to all, which underpin the UK's fundamental capability in water, land, and air science. This includes large-scale research programmes and the Environmental Information Data Centre, which deliver openly accessible datasets, software models and decision-support tools, supporting world-class UK science and addressing the socio-economic challenges of environmental and climate change.



NPL is the UK's National Metrology Institute, responsible for developing and maintaining the UK's national primary measurement standards. It is a PSRE sponsored by the Department of Business, Energy, and Industrial Strategy (BEIS), is a Public Corporation wholly owned by BEIS and helps deliver the UK measurement Strategy in partnership with BEIS. NPL has a partnering agreement with BEIS and the University of Strathclyde and the University of Surrey.

Headquartered in Teddington, south-west London, NPL employs over 800 scientists, engineers and apprentices, and hosts over 200 postgraduate researchers as part of its Postgraduate Institute for Measurement Science (PGI). NPL has a close relationship with academia, related research organisations, and industry in the UK and globally.

NPL undertakes science and engineering to provide the capability and infrastructure that is crucial in researching, developing, and testing new products and processes. NPL's measurement expertise supports a range of sectors across the UK, from new antibiotics and more effective cancer treatments to developing quantum communications and superfast 5G.



Why are PSREs important?



PSREs are mission-led enabling a more strategic approach

PSREs are driven by a set of defined missions, outcomes, or responsibilities, which enables long-term strategic thinking about things like infrastructure and talent. It also gives them a clear pitch to potential partners about the value of engagement, especially those in industry. Their missions shape their research and innovation activity, allowing them to focus on translating evidence into real world impact.



PSREs deliver critical national capabilities

PSREs provide unique or national capabilities which are critical to the functioning of the research and innovation ecosystem. These may be contracted by government or involve the provision of vital infrastructure to academia and industry. Access to these capabilities drives business engagement, by playing a crucial role in de-risking business research and innovation. These capabilities are one of the main reasons that many scientists and businesses are attracted to collaborating or investing in the UK.



PSREs help build a talented and diverse science workforce

A thriving and sustainable research and innovation ecosystem relies on a diverse and talented workforce that can take science from the lab to the marketplace. Currently, many STEM students choose to move into the private sector, stay in academia, or leave STEM entirely, with limited changes thereafter. However, PSREs offer an attractive combination of research excellence and the chance to develop transferrable skills and experience, including of commercial delivery and working across disciplines. Strong networks between public and private research and innovation organisations produce 'virtuous circles', with high transfer of skills, knowledge, and people.

Our recommendations: Unlocking the potential of PSREs

The government and research sector should take steps to improve their understanding of PSREs and move from seeing them as service providers to strategic partners.

The government's 2019 Science Capability Review³ recognised that PSREs are a significant public asset that are currently under-utilised and not well understood across government. Beyond their research output, PSREs possess deep and largely untapped expertise of the wider research and innovation ecosystem. This includes a strong understanding of key delivery challenges, sector trends, the international landscape, and societal outcomes. Failing to harness the diversity and breadth of this expertise risks undermining the potential strength of the UK's research and innovation landscape.



PSREs need more sustainable funding, including longer-term government budgets.

Previous science budget cuts have had a disproportionate impact on PSREs meaning their contribution to the government's 'science superpower' ambition is currently underpowered. It is therefore critical that PSREs are represented in conversations about how to strategically spend rising public R&D investment, including departments being clearer about what they want from their PSREs.

The ability of PSREs to deliver the asks of departments and build more strategic partnerships depends on how they are funded. As such, the government must go further to provide longer-term R&D budgets for PSREs. Long-term budgets are critical for research generally, but particularly for PSREs which have significant infrastructure needs. Without financial stability, their ability to think strategically is restricted, slowing or entirely preventing investment in long-term capability.

Furthermore, many PSREs are limited to, or restricted from, applying for competitive grants from UKRI. Compounding this, when organisations can bid for such grants, funding at 80% of full economic cost often makes projects unviable as PSREs do not have access to flexible funds like quality-related (QR). Future funding decisions should consider the impact of these issues, with improved financial support of PSREs standing to benefit the whole R&D ecosystem.

2

The cross-government Science & Technology strategy should lead a step-change in approach to the governance of PSREs.

We heard that effective governance is as critical as funding. Large numbers of reviews and policy changes from government consume time and result in frequent strategic shifts, while long sign off procedures disrupt timelines. This hinders the ability of PSREs to plan for the long term, deterring industry partners that might otherwise provide matched funding for R&D projects or programmes.

The UK's cross-government Science and Technology strategy should therefore focus on leading the step-change in thinking that will be required to unleash the full potential of PSREs, which will in turn support the government to achieve its ambition to be a "science superpower". This should build on existing work, including the GO-Science PSRE Value Framework⁴. The framework provides departments with a broad set of common principles to accurately assess the value and performance of the PSREs they sponsor, and to think critically about how they could be better utilised. The new Office for Science and Technology Strategy provides an important opportunity to support the incorporation of PSREs into a long-term cross-government science and technology strategy.

3

Partnerships should be strengthened between PSREs and policy teams across government, industry, and academia.

Strong partnerships with academia, industry, and government are critical to harnessing the strengths of PSREs. However, there is currently a poor understanding of the role and strengths of PSREs, even within the government departments that provide them with strategic oversight and funding.

Chief Scientific Advisors should work with their departments to improve this, including by highlighting that PSREs are stable, mission-focused institutes, well-suited for long-term engagement. All parties must communicate regularly and thoughtfully. This includes policymakers clearly articulating their policy needs, and PSREs synthesising their research into relevant and digestible messages.

Meaningful engagement with PSREs stands to improve the transfer of skills, knowledge, and people, while also helping to build the regional 'brand' of PSREs, enabling them to attract further funding and talent.

About CaSE

The Campaign for Science and Engineering (CaSE) is the UK's leading independent advocate for science and engineering. Our mission is to ensure that the UK has the skills, funding and policies to enable science and engineering thrive. We represent over 115 scientific organisations including businesses, universities, professional bodies, and research charities as well as individual scientists and engineers. Collectively our members employ over 341,000 people in the UK, and our industry and charity members invest around £29bn a year globally in R&D. We are funded entirely by our members and receive no funding from government.

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References

1. The Role of public and non-profit research organisations in the UK research and innovation landscape, Royal Society. [September 2020]
2. Realising our ambition through science: A review of Government Science Capability. GO-Science. [November 2019]
3. *ibid.*
4. Guidance on assessing performance and value of PSREs. GO-Science. [January 2022]