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Economic Development & Transport Committee
National Assembly for Wales
Cardiff Bay
CF99 1NA

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Dear Meriel

SCIENCE POLICY IN WALES

Thank you for providing the Higher Education Funding Council for Wales (HEFCW) with an opportunity to contribute to the Economic Development and Transport Committee's review of science policy in Wales.

The Council's formal response is attached to this letter. I should, however, like to preface this response by drawing attention to the significant contribution that Welsh higher education institutions (HEIs) are already equipped to make to the development and application of science in Wales.

Recent studies conducted both here and on a wider UK basis have identified science and innovation as driving forces in economic growth. Outputs from the science base – such as new knowledge, skilled people, new methodologies and new networks – contribute to improvements in a range of key areas, which includes wealth, health, education, environment and culture. The scientific expertise that resides within Welsh HEIs is already impacting on all of these areas (see attached submission for examples), but there is potential to develop its impact still further. Strategically deploying this expertise in the three ways listed below will place the HE sector at the heart of science development in Wales to the benefit of both its economy and society.

The three key ways in which HEIs can contribute to the Assembly's ambitions for science in Wales are by:

- (i) **Advancing scientific education in Wales** in order to achieve a flow of science graduates who remain in Wales to take up employment or establish their own businesses. This means not only ensuring excellence in HE level science provision within our universities, but also promoting the study of science and its value to the public at large – eg through activities with schools and young people to engage an early interest in a career in science; work, in particular, to draw into science learners from backgrounds traditionally under-represented in HE; public lectures, demonstrations and other activities that widely promote the value of scientific study and disseminate advice on key issues like energy efficiency or healthy living.

- (ii) **Research activity** is at the core of the UK's knowledge base and the capacity to translate research outcomes into business and public service innovation is a key driver of economic growth. As the attached submission illustrates, Welsh HEIs make a significant contribution to a UK science base that HM Treasury describes as "one of the most productive and influential systems of publicly funded research in the world". Underpinning this UK science base is the *dual support system*, which funds university research activities by combining core annual funding through the HE funding bodies, with more focused project and programme funding from the Research Councils and other organisations. HEFCW's research funding to HEIs in Wales is, therefore, an important component of this system in that it helps provide a strong, flexible and adaptable research base in Wales that can be mobilised in support of Assembly policy and/or focused over a range of priority areas. In this context, the *Nexus Report* from the Assembly's Task and Finish Group on the Role of HE in Economic Development set out a vision of Wales as a "small clever country" and recommended ways in which the research activities of our HEIs might be developed to the benefit of both Welsh academia and the economic and social well-being of Wales in general. The attached submission provides examples of areas in which Welsh HEIs are already doing just this. The challenge for the future will be to find ways to strengthen and sustain this research base to enable HEIs to continue to respond quickly and flexibly to both existing and new Assembly imperatives and priorities.
- (iii) **Knowledge Transfer** forms part of the so-called *third mission* activities of our universities, on top of their more traditional missions relating to teaching and research. It is all about exploiting (in this case) the scientific knowledge and expertise that resides within HEIs for the benefit of society and economy. Knowledge transfer activities are delivered in many guises. Sometimes technology transfer is at their core and sometimes it is human transfer that provides the catalyst for new developments; but both ultimately lead to new applications of knowledge and/or technological expertise. In this way science and innovation are drivers of productivity growth and the knowledge transfer activities of universities have an important role to play in encouraging more Welsh businesses (particularly SMEs) to tap into the expertise that resides within the HE sector in Wales, and perhaps to become more R & D active themselves. Equally important in this area, however, is the need to engender within our universities a culture of enterprise that encourages, and a support framework that facilitates, increased commercialisation of the science base. Again, the attached submission provides example of how this is being achieved currently.

I trust that this response demonstrates the commitment of HEFCW to work with the Assembly and other partners in developing and implementing policy in this area. I am aware, too, that the submissions from the Welsh Development Agency and the Heads of Higher Education in Wales (HEW), together with the Welsh Assembly Government's position paper, also emphasise a central role for the HE sector in this important policy area. We are, of course, at your disposal should you wish to take oral evidence from the Council; indeed, we would very much welcome the opportunity to do so.

We have no objections to the publication of this response.

Yours sincerely

A handwritten signature in black ink that reads "Phil Gummett". The signature is written in a cursive style with a long horizontal line extending to the right from the end of the name.

Phil Gummett

**REVIEW OF SCIENCE POLICY BY THE NATIONAL ASSEMBLY FOR WALES'
ECONOMIC DEVELOPMENT COMMITTEE -**

**SUBMISSION FROM THE HIGHER EDUCATION FUNDING COUNCIL FOR WALES
(HEFCW)**

(i) Current range of research & development (R &D) carried out in Wales in both the public and private sectors

1 Attached to this submission are annexes that provide detailed information about the:

- breadth and quality of research activity currently being undertaken by Welsh higher education institutions (HEIs);
- funding of this research activity; and
- ways in which the outputs of Welsh HE research are currently being developed and deployed.

2 These annexes provide the following information:

Annex A – A summary of the research assessment ratings (RAE)* of Wales' twelve higher education institutions

Annex B – Current levels of main HEFCW recurrent research funding by institution

Annex C – A summary of total HEFCW research funding for the academic years 1996/97 to 2005/06

Annex D – A summary of non-HEFCW research funding awarded to Welsh HEIs for the academic years 1996/97 to 2005/06

Annex E - A table that maps out how Welsh HEI research outputs are currently being applied to industry

**Paragraph 3 below describes the RAE*

3 The following bullet points provide a brief background to the Research Assessment Exercise (RAE)

- The Research Assessment Exercise (RAE) is a periodic, UK-wide assessment of the quality of research undertaken in HEIs. The exercise is conducted jointly by the four UK higher education funding bodies – the Higher Education Funding Council for England (HEFCE), the Scottish Higher Education Funding Council (SHEFC), the Higher Education Funding Council for Wales (HEFCW) and the Department for Employment and Learning, Northern Ireland (DELNI).

- The primary purpose of the RAE is to provide quality assessments to inform the selective distribution of grant for research to institutions. HEFCW's main research grant (QR) of around £59 million per annum is allocated on the basis of the RAE outcomes.
 - Institutions are invited to submit research outputs and supporting material for assessment. Assessment is based on some 70 subject-based Units of Assessment, and is undertaken by panels of experts.
 - In the 2001 RAE, quality ratings were awarded on a seven point scale – 5*, 5, 4, 3a, 3b, 2, 1. A rating of 5* indicated research of international excellence, and a rating of 1 indicated little or no research of national excellence. The 2001 RAE rating scale is attached as part of Annex A.
 - The next RAE will take place in 2008, when outcomes will be expressed in terms of quality profiles rather than ratings. These profiles will show, for each submission, the proportion of research activity assessed as meeting each of four “starred” quality levels. These quality levels will range from four star (quality that is world-leading in terms of originality, significance and rigour) to one star (quality that is recognised nationally in terms of originality, significance and rigour). Activity that falls below the standard required for one star will be included in the profile as unclassified.
- 4 To supplement the data provided in the annexes listed in paragraph 2, we offer three examples that illustrate how HE research expertise is currently being exploited for the benefit of society and economy in Wales. In considering these examples please note that we are using the definition of *science* in HM Treasury's Ten Year Science and Innovation Investment Framework, which embraces “all aspects of engineering, technology, mathematics, design, social sciences and the arts and humanities”.

4.1 Lodgeson's Ltd & National Centre for Product Design and Developmental Research (PDR) at UWIC

Lodgeson's Ltd is a small Cardiff based manufacturer and distributor of control systems, which offer disabled drivers freedom through personal transport. UWIC's PDR has worked with Lodgeson's to redevelop the company's core product. The work involved research into key ergonomic and anthropometric data to ensure appropriate, size, shape and functionality of the redesigned product. The PDR also provided state-of-the-art 3D computer-aided design, visualisation and rapid prototyping in the development of the mechanical, moulded and keypad elements of the product. This new design, which includes a patented quick release system, has provided Lodgeson's with a product that is quicker and simpler to assemble, and with an associated cost reduction of some 40%. Moreover, these combined benefits have allowed Lodgeson's to progress plans to begin distributing this product across Europe.

4.2 Molecular Light Technology Ltd (MLT) – Spinout company from Cardiff University

MLT was founded in 1989 by Stuart Woodhead and Ian Weeks who, together with Tony Campbell, invented the chemi-luminescence technology on which the company is based whilst at the University of Wales College of Medicine (now Cardiff University). MLT first developed this technology for use in clinical diagnostic markets and has now gone on to develop a wide range of applications in toxicology and the monitoring of environmental pollutants. Based in Cardiff, though now a subsidiary of the USA company, Gen Probe Inc., MLT has a turnover in excess of £4m and has created 31 skilled jobs.

4.3 UK Skillset Screen Academy for Wales

This is a collaborative venture led by the University of Glamorgan, which includes four other Welsh HEIs, that has successfully bid to establish a Screen Academy for Wales – one of a network of eight Skillset Screen Academies being established across the UK from September 2005. Welsh HE expertise in a range of creative industry related subjects is being brought to bear in this academy that, whilst a stand-alone project in its own right, is also an important building block towards the realisation of the Dragon Studios development that is set to change the landscape of the creative industries in Wales. Through this project academia and business are working in partnership to ensure that Wales becomes an integral part of a film training and education network that is expected to transform the UK film industry and in so doing, make a significant impact on inward investment in Wales.

(ii) Ways in which R & D in Wales can be strengthened and made more effective

- 5 As our covering letter indicated, Welsh HEIs start from a position of strength because they are already part of “one of the most productive and influential systems of publicly funded research in the world”. HEFCW’s QR funding (Annex B refers) is part of the *dual support system* that underpins the science base by providing core annual funding to support HEIs’ research activities, alongside more focused project and programme funding from the UK Research Councils and other major bodies (Annex C refers). Welsh HEIs operate on not just a national, but also on an international stage and the greater the level of internationally recognised excellence in their research and/or teaching activities, the greater is the capacity to deploy their expertise in support of key Assembly policies and strategies.
- 6 The capacity of the HE sector to contribute to the delivery of Assembly goals and objectives is recognised in *Reaching Higher*, which sets out the Assembly’s long term vision for the HE sector in Wales. *Reaching Higher* aspires to “**world class performance** variously through teaching, research, community outreach and knowledge exploitation and transfer.” However, *Reaching Higher* also makes very clear the Assembly’s contention that in order to achieve *world class performance*, “reconfiguration and collaboration must be at the heart of the strategy for HE in Wales”. For example, in relation to research, *Reaching Higher* states explicitly that no single institution has the

capacity to cover the entire scope of even a single leading edge technology. Instead it envisions a sector “defined less by institutions than by networks of excellence” in which, for example, “research clusters develop in fields that are crucial to the growth of the knowledge economy and build on those aspects of Welsh life which are distinctive to Wales”. The cluster described in paragraph 4.3 above that has emerged to take forward the Screen Academy and Dragon Studios developments within the creative industries sector is a good example of how the current funding system provides a strong teaching and research base that is able to respond quickly and flexibly to new developments. Another good example is the Cardiff Gene Park whereby Wales has secured a multi-million pound investment that will exploit the bio-science expertise of five Welsh universities. The first phase of this development, a virtual gene park, is underway but the significance for Wales goes beyond the scientific impact. The Gene Park will also bring enormous educational and economic benefits to Wales. To quote Professor Martin Evans of Cardiff University, the real role of the park “is to communicate the present and deliver the future”. Beyond these examples, much of the current work on reconfiguration and collaboration in the HE sector in Wales is aimed at strengthening capacity in both research and knowledge transfer.

- 7 We would argue that it is important that HEIs in Wales continue to be adequately supported to enable them to maintain strong and flexible capacity to respond to Assembly policy imperatives and other national and international strategic developments. **Annex F** explains the basis on which HEFCW currently allocates QR funding, which provides this flexible platform from which funds can be won from other sources for more focused purposes. Annexes C and D (already referred to in paragraph 2), together provide a fuller picture of the other sources that Welsh HEIs are drawing upon in support of their research activities.

- 8 **Annex G** provides further data, this time taken from the 2004 annual survey of HE-Business & Community Interactions (HEBCIS), which compare the R & D performance of HEIs in Wales with the performance of HEIs in other UK regions. The HEBCIS data relate to performance in the academic years 2001/02 and 2002/03 (publication of the 2005 HEBCIS data is not expected until November 2005) and indicate that in a number of key areas, Wales is punching above its nominal 5% UK weighting. For example Welsh HEIs :
 - achieved a 28% increase in income from collaborative research involving both public and business funding and in 2002/03 outperformed Scotland, Northern Ireland and five of the nine English regions in this area to account for nearly 10% of overall UK income performance;
 - out-performed English regions with just one exception (London) in income generated from consultancy contracts to account for almost 12% of UK HE consultancy income in 2002/03 (an improvement of 60% on 2001/02);
 - more than trebled income levels from the hire of facilities and equipment related services and in 2002/03 accounted for over 8% of all UK activity in this area;

- accounted for almost 6% of total UK spinout and staff-start-up activity. Across the UK, Wales also accounts for 5% of all such companies that remain active after three or more years' duration and generates over 7% of UK turnover from all active companies (circa £28.6m).
- 9 However, Annex G also highlights areas where performance in Wales compares unfavourably with other parts of the UK. For example, Welsh HEIs:
- are out-performed by HEIs in every UK region except the North East and Northern Ireland in relation to research contracts with business (Table 1b) and account for less than 3% of associated UK income;
 - filed fewer new patent applications than any other region and have a cumulative portfolio of active patents that accounts for only 3.1% of the UK total;
 - accounted for under 2% of licences granted to UK HEIs in 2002/03; and
 - generated just over 4% of income from UK HEIs' intellectual property in 2002/03 (although this also represented a 14% improvement on performance in 2001/02).
- 10 The shortcomings highlighted in Annex G, however, are not unique to Wales and they are already being addressed both in Wales and on a UK-wide basis. For example, the HEBCIS data vindicates the conclusion of the Lambert Review that too few UK businesses engage in shared R & D with universities. Within Wales, HEFCW's Third Mission Fund has enabled all HEIs to establish and staff a dedicated point of contact for businesses, and schemes such as the Technia Strategy and KEF's Collaborative Industrial Research Projects and Technology Transfer Centres are providing a means to introduce businesses to Welsh HE expertise, often for the first time. On a UK-wide basis, central Government has enabled R & D contracted out to universities to be eligible for tax credits, thus reducing the net cost to business, and the new delivery plans of the Research Councils put a growing emphasis on engaging with business and other research users in the design and delivery of their programmes.
- 11 The *Nexus Report* spoke of a "dual support system" to underpin the R & D activities of HEIs and their associated impacts on the Welsh economy. We agree that this is the best way to balance the maintenance of a strong but flexible research base in Wales, with a capacity to focus funding on areas of particular policy importance, drawing on a wide variety of Welsh and other funding sources. This approach could readily be developed further through a more strategically co-ordinated funding approach across all those organisations in Wales that play a key role in facilitating the exploitation and/or commercialisation of university research outputs. The foundations for such joint working are already in place and manifest themselves in such initiatives as the CETICs Programme, the Wales Spinout Programme, the Knowledge Exploitation Fund (KEF) HEFCW's Third Mission Fund, and dialogue between agencies in the context of decisions about HE reconfiguration and collaboration funding.

- 12 HEFCW's Third Mission Committee also provides a vehicle for joint working and its membership brings together not only the Welsh HE and public sectors (HEFCW, WDA, ELWa and the WAG HE and EDT Teams are all represented), but also representatives from the business sector in Wales. In response to the *Nexus Report* the Third Mission Committee has established a task and finish group to look at ways in which HEFCW and the WDA might work together more strategically in support of HEIs' knowledge transfer activities. Other areas of activity currently under consideration by the Committee, which are particularly relevant to the development and application of science in Wales include:
- Increasing the level of R & D interaction between HEIs and businesses in Wales through such activities as staff and student placements (including KTPs – Knowledge Transfer Partnerships); consultancy services and the creation of innovation networks and technology transfer centres.
 - Working with the emerging Sector Skills Councils and other representatives of business in Wales to encourage more Welsh firms to engage in R & D and to identify the most effective way of engaging universities in this process.
 - Fostering more collaborative activity in established areas of research that either support the Assembly's identified *priority sectors* and/or facilitate the development of niche markets by utilising HE expertise and associated services to attract new inward investors (eg via the Technium approach).
 - Encouraging and enabling HEIs to commercialise their intellectual property – principally through licensing and patenting, access to venture capital and new business spin-outs and spin-ins.
 - Creating a culture that both encourages and incentivises academics to become more commercially aware and entrepreneurial in outlook both through staff development activities and targeted funding. For example, the Science Research Infrastructure Fund (SRIF3), which provides capital funding for research with the expectation that HEIs develop greater access for business to their facilities.
 - Ensuring that HEIs in Wales are well-placed to maximise opportunities that will arise from the recent establishment of the Scientific Council of the European Research Council (ERC) that will support and fund research at a European level, through FP7.

(iii) Likely priorities for science awareness, skills provision, HE excellence, technology transfer and innovation

13 Our covering letter has already summarised the three key ways in which Welsh universities are able to assist the Assembly in delivering its science policy. Hopefully this response has provided some concrete examples of how the HE sector is able to mobilise all of its missions – teaching, research and knowledge transfer (the third mission) - to contribute to Assembly priorities in all of the activity areas listed at (iii) above.