

Preparing for the 2014-2020 Round of European Programmes Reflection Exercise A submission by Higher Education Wales

1. About Higher Education Wales

Higher Education Wales (HEW) represents the interests of Higher Education Institutions (HEIs) in Wales and is a National Council of Universities UK. HEW's Governing Council consists of the Vice-Chancellors of all the HEIs in Wales. HEW provides an expert resource on the Welsh Higher Education sector.

2. About this response

HEW welcomes the Reflection Exercise launched by the Welsh Government. Whilst it remains too early for some important elements of the future Cohesion Policy to be known, it is opportune for Wales to consider where its priorities should lie. In making our response we recognise that Wales's future economic prosperity depends on its ability to be a full participant in the global knowledge economy. At the same time the promotion of social justice depends fundamentally on the creation of economic prosperity and expansion of high level educational opportunities for people across Wales. The Welsh Government's twin objectives of social justice and economic prosperity must be the cornerstone of our collective reflection in preparing for the next round of European Structural Fund programmes.

The response emphasises the following:

- The importance of the European policy context – this stresses research and innovation, SME competitiveness, skills development and a resource-efficient low-carbon economy. Future EU programmes in Wales should fully respect this.
- The importance of building on the current programmes and learning from past experience. Progress has been made in developing a knowledge based economy through a more strategic approach. This should be continued and strengthened.
- Reflecting Welsh economic performance - notably low levels of productivity, low levels of innovation and low skill levels. Future European Programmes in Wales should respond to this by seeking to enhance levels of innovation and productivity and support higher level skills development.
- In considering the thematic focus of future Programmes, all should emphasise a strengthening of research, technological development and innovation, SME competitiveness and the development of a resource-efficient low-carbon economy. These themes should run through all the European programmes in Wales.

- A strong emphasis should also be placed on investing in education, skills and lifelong learning, which will help to address employability concerns, social inclusion and the combating of poverty as well as promoting greater levels of productivity.
- An integrated approach should be adopted across funding programmes in terms of the key themes being addressed.
- The opportunities to build synergies with *Horizon 2020*, (the proposed new programme for research and innovation and successor to the seventh Framework Programme), and other research and innovation programmes should be taken, and serve as a longer term aim for programmes in Wales.

The response also makes the following points which address specific questions raised in the exercise:

- There should be no significant difference in emphasis between the East Wales and West Wales and the Valleys Programmes.
- Prioritisation of the nine proposed sectors might not be the most effective means of delivering desired objectives.
- The current approach to cross-cutting themes may not be the most effective way of tackling these issues.
- The spatial concentration of activity suggested has some merits but needs to be further considered.
- Some of the current indicators used for monitoring research and innovation activities are misaligned with wider objectives of the programmes.
- The inclusion of European Territorial Cooperation Programmes in this Reflection Exercise is to be welcomed.

3. Introduction

HEW recognises that the radically changed economic climate means that we will need to build on the diversity, innovation and flexibility already inherent in the higher education system in Wales, to continue to maximise the efficiency of the services we deliver. Universities in Wales have differing missions and complementary strengths - yet each university is committed to the fulfilment of the vision set out in the Assembly Government's *For Our Future* strategy. Welsh Universities play a pivotal role in the Welsh economy and provide the training for the high level skills on which the future prosperity of Wales depends. The sector is one of few indigenous generators of substantive research in Wales and plays a key role in transforming the results of this research into innovative commercial products, promoting entrepreneurship, business development and growth. Strengthening the research, innovation and teaching base of Wales also provides longer term benefits through the restructuring of the economy to increasing our leverage of national and international resources which will otherwise be lost to Wales.

The university sector is keen to work with partners in liaising with EU institutions during key negotiations on the draft regulations, including the Welsh and UK Governments and MEPs. Liaising with Welsh and other MEPs will be increasingly important given their wider powers to decide on the Commission's proposals. The WHEB office in Brussels will be working with colleagues in Wales House to promote the interests of Wales and its university sector. Higher Education Wales's Pro Vice-Chancellor Research Group will also be visiting Brussels for meetings with EU officials on this and other topics in early Spring 2012.

The stakes for Wales are high: as a nation we are the poorest and least productive nation or region in Britain.¹ This Reflection Exercise takes place in a wider context in which the UK's competitor nations are moving ahead by increasing investment in research and science - and rapidly increasing the number of people with high level skills. This year China is estimated to have enrolled 30 million students in higher education. The next round of European Programmes offers a crucial opportunity for Wales to invest in its future and to begin to close the gap on the rest of the UK and the EU, through strengthening the global competitiveness of our economy.

Universities in Wales have been actively engaged in delivering Structural Fund programme objectives for many years. This provides a wealth of knowledge and experience which we are happy to share in this Reflection Exercise. As a sector and as individual institutions we have contributed to a number of official consultations and inquiries relating to the Structural Funds in Wales and we hope that the evidence provided to these Committees and bodies will also be taken into account in the current exercise.

4. Context

Reflecting on the future shape of European Programmes in Wales, HEW has taken into account two major considerations. Firstly, the European policy context in which any negotiations will be set and, secondly, the challenges and opportunities facing Wales today.

- **European Policy Context**

HEW believes that future European Programmes in Wales will need to respect key EU policy objectives as well as Welsh priorities. Here the goals of the *Europe 2020* strategy, the associated 'flagships' and *Regions 2020*, provide a framework which will shape our future programmes. Within this context HEW can see that Innovation, Skills, Demographic Change, Energy and Climate Change are emerging as key considerations in the development of future programmes. HEW believes that this should be taken into account in the development of future European Programmes in Wales.

¹ Investing for the Upturn - A briefing for the National Assembly for Wales from Higher Education Wales, January 2011

HEW supports the desire of the EU to stimulate smart, sustainable and inclusive growth and anticipate that this will be followed through in future European Programmes in Wales. In doing so HEW hopes that our future programmes will build upon the strong foundations which have been laid in previous European programmes, both those funded through the Structural Funds and those funded through other sources such as the *RTD Framework Programmes*, the *CIP* and funds such as the lifelong learning programme. HEW would also encourage lessons to be learnt from innovative approaches – such as *JEREMIE* in Wales – and, in a different aspect, from those projects which have been less successful.

One of the key elements of current EU policy is its increased emphasis on greater integration in approach. This was strongly visible in the green paper on a *Common Strategic Framework for Research and Innovation* published by the European Commission in 2011. HEW hopes that this move towards integrating areas of common interest across funding programmes might be favourably considered in the future rounds of European Programmes in Wales.

- **Challenges and Opportunities Facing Wales**

The second major consideration is the performance of the Welsh economy. As already noted, this lags behind the UK, and much of the EU, across key indicators. The evidence for this is well-known and well-set out in numerous reports, including the Reflection Paper itself. HEW would like to highlight two key dimensions to this. Firstly, there is the poor comparative innovation performance of the Welsh economy as a whole. This has implications for the continued competitiveness of firms, Higher Education Institutions and Research Institutes across Wales and, ultimately, on the employment prospects and economic well-being of residents of Wales. Addressing this requires investment in knowledge development, productivity improvement and skills. Secondly, Wales, as with the EU, is under-investing in products and processes which are required to meet identified forthcoming societal challenges, such as demographic change, climate change and the low-carbon economy. This has social and environmental implications and will ultimately impact on the well-being of residents and may also have economic implications in so far as our firms and institutions fail to invest in future market opportunities.

5. Reflections on Future European Programmes in Wales

HEW believes that the next round of Structural Funds should shift to a focus on interventions which will have long-term beneficial outcomes for the Welsh economy. The transformation of the Welsh economy from a low value, low employment economy to a high value, full employment economy requires future programmes to move away from current approaches centred on predominantly transactional outputs towards more transformational strategies. Research and innovation help to deliver jobs, prosperity, quality of life and global public goods. They generate the scientific and technological breakthroughs needed to tackle the urgent challenges society faces. Investment in these areas also leads to business

opportunities by creating innovative products and services. Universities in Wales recognise the importance of utilising the Higher Education sector, in combination with European Structural funds, to assist in the development of sustainable and advanced high tech businesses. These would contribute to economic regeneration generally and more particularly, would counter disadvantages resulting from the current economic situation, decreasing energy costs along with promoting better, cleaner and more efficient industries. A strategic approach across all EU programmes in Wales which embraces 'smart specialisation' and better aligns different EU funding programmes, including *Horizon 2020*, could help the future prosperity of Wales. To secure transformational change in the Welsh economy would also require the promotion and support of strategic projects which combine to develop centres of excellence in Wales, which would have the credibility to attract mobile investment and form the basis of an internationally-recognised knowledge economy.

To achieve the longer term aims of Wales, HEW believes that any future programmes should support the EU's strategy of promoting smart, sustainable and inclusive growth and concentrate on four key areas:

- Enhancing innovation capacity in Wales through investing in research capabilities, knowledge exchange, and the exploitation of new ideas.
- Contributing to the development of Welsh human capital and skills.
- Promoting enterprise, business development and growth through productivity enhancement.
- Improving social equality through regeneration and cultural development.

These are the key areas identified in the recent publication 'Connecting Universities to Regional Growth: A Practical Guide' which outlines the key role of universities in developing regional economies and is endorsed by the Commission.

- **Research and Investment**

Fundamental to a thriving knowledge-based economy is a robust research and investment (R&I) infrastructure. The draft ERDF Regulations stipulate that specific investment priorities will include enhancing research and innovation infrastructure capacities to develop R&I excellence and promoting centres of competence. HEW endorses this approach. Wales should be investing in the future and committed to the concept of 'stairways to excellence' whereby Structural Funds are invested to build the capacity for Wales to compete on a global stage in the future. A strong benchmark for this will be the ability of Welsh firms and institutions to engage in competitive, excellence-driven programmes such as *Horizon 2020* and *ERASMUS for All*. In doing so, it is important that the Structural Funds are not only used to develop indigenous resources but also help to attract talent from around the world; on which future prosperity can build.

It is essential that future European Programmes in Wales continue to provide support to build capacity and enable both the growth of existing research teams and clusters in our

Universities with an increased focus on working with companies and transferring technology and the creation of new centres of research excellence for the benefit of the regional economy. Both types of activity serve to attract the best researchers to the University, which, in turn, can use the facilities made available by ERDF to give them a greater opportunity of success in securing further funding from FP7 or RCUK, which in turn, would lead to applied project development and economic outcomes. Through such activities Wales would be able to forge the capacity on which future growth can be built through research and innovation partnerships with the private sector. This is a long-term 'high road' strategy to securing future prosperity, around which only a limited number of ad hoc examples are currently identifiable in Wales. Attached at Annex 1 are some examples of successful projects.

In the case of the ERDF, a focus on research and innovation, SME competitiveness, energy efficiency and renewables is also in accordance with the provisions of the proposed ERDF Regulation published in 2011. In the case of the ESF, a focus on education, skills and lifelong learning, complementing approaches supporting employability, is also in line with the provisions of the proposed ESF Regulation. HEW welcomes the commitment in the Regulation that the ESF should make a valuable contribution to the priorities of the *Europe 2020* Strategy, such as strengthening investment in research and innovation, increasing the competitiveness of SMEs, and supporting the shift towards a low-carbon economy. It is hoped that the Reflection Exercise also reflects this focus.

- **Integrated Approach**

HEW welcomes the integrated approach which is highlighted in the Reflection Paper (p.16). This Reflection process provides an opportunity to develop a coherent approach across all four of the CSF fund programmes and the European Territorial Co-operation programmes. HEW hopes that this opportunity is taken. Within this approach, HEW is firmly of the view that the programmes should emphasise the strengthening of research, technological development and innovation and SME competitiveness, whilst moving towards a more resource-efficient low carbon economy. HEW also believes that a strong emphasis should be placed on investing in education, skills and lifelong learning. This integrated approach will help to inform the allocation of resources referred to in the Reflection Exercise (Section 5).

- **Collaboration**

Given that some two-thirds of productivity growth is generated through innovation (*NESTA*, 2010) this must clearly be a priority given the productivity gap in Wales. As such, HEW is of the view that future European Programmes in Wales should emphasise research and innovation capacity and activity, particularly through supporting the provision of collaborative infrastructures and activities and by stimulating collaboration between researchers and industry. The current European Programmes have demonstrated the potential of this approach and future programmes can usefully build on the advances which have begun to

be made. A strong emphasis on the low carbon economy also provides a valuable strategic direction to the programmes, and encourages targeted research and innovation.

Such an approach would help build lasting foundations for future prosperity in Wales over the lifetime of the programmes, and would also capitalise on the investments already made. As the Reflection Paper identifies, one of the key challenges facing Wales is its weak productivity performance, a fact exacerbated by low skill levels and by poor levels of innovation. Focusing on these three themes, within a resource-efficient low carbon framework, would act to build embedded entrepreneurial capacity across Wales and so begin to address this productivity challenge. In doing so the programmes should seek to address the capacity to generate knowledge, the capacity to absorb knowledge, the capacity to exploit knowledge and, crucially, the leadership capacity required to manage this process amongst firms, in knowledge institutions and in the public sector.

In terms of approach, HEW does not believe that there should be a different emphasis in East Wales to West Wales and the Valleys. The overarching challenge is similar. Also the three areas have deeply integrated economies and future European Programmes should recognise this integration, in so far as EU programming rules allow it. Current projects, such as the Low Carbon Research Institute, demonstrate the potential offered through pan-Wales collaboration to develop globally competitive centres of innovation. Collaborative, cross-programme activities which overcome the artificial divides of programme boundaries, wherever possible, should be encouraged. This will be more achievable where programmes adopt a common emphasis. This should be reflected in the scale of resources being dedicated to R&D and innovation, SME competitiveness and the low carbon economy. HEW believes that significantly more than 50% of programme funds should be dedicated to these three themes in a future programme for West Wales and the Valleys. The 80% proposed for a future East Wales programme is a sensible approach to the opportunities and challenges facing Wales.

- **Widening Access and Higher Skills**

HEW recognises the importance of promoting social inclusion and combating poverty. Universities are actively working towards this through initiatives such as the University of the Heads of the Valley Institute and the Coleg Cymraeg Cenedlaethol, which will help to widen access to Higher Education. Widening access to education opportunities, raising skills and helping people to avoid the trap of a dwindling supply of poorly paid low skilled jobs in the future, is an essential element in combating poverty and tackling social exclusion.

The Higher Education sector in Wales is playing a significant role in promoting employment and supporting labour mobility in Wales, through high-quality, and often bespoke, skills development, including work-based training of graduates. Through engagement with companies and as educators, HEW appreciates the significance of investing in education, skills and lifelong learning for the future prosperity of Wales. It is crucial that the future European Programmes in Wales recognise the importance of higher level skills as well as

the more traditional focus on basic skills. A highly skilled workforce is one able to meet the future demand for labour and able to contribute to SME competitiveness in a global economy.

- **Generating of Capacity**

The capacity to generate innovation within Wales is limited. This is partly due to a relatively weak capacity for research and low levels of exploitation of that research. Wales must support a strengthening of this fundamental foundation for a future knowledge-based economy in Wales. Welsh Universities are helping this through mergers, strategic alliances, new research collaborations and joint investments. The sector is also actively working with key 'anchor' companies such as Airbus, Boots and Tata as well as with a myriad of smaller leading-edge companies. Much of the progress which has been made has been assisted by European Structural Funds. It is essential that future European Programmes continue to build and strengthen Wales's capacity to engage in a globally competitive knowledge economy.

- **Themes**

In terms of the EAFRD and the EMFF, HEW is of the view that the themes of research, technological development and innovation, SME competitiveness, and investing in education, skills and lifelong learning, are as crucial to meeting these programme objectives as they in terms of the ERDF and ESF programmes.

Caution should be exercised when considering the matter of the cross-cutting themes. Evidently these are important themes but the manner of the implementation of these activities in the current programmes, needs consideration. HEW considers current projected practices are leading to a dilution, and duplication, of effort which is adversely affecting the laudable and commendable aims of the programmes in this area. A programme-level approach, which focuses on establishing minimum standards for activities, and identifies efficient delivery mechanisms should be considered for the future.

- **Areas of Activity**

HEW would advocate vigilance when considering the merits of prioritising the nine sectors highlighted in the Reflection Paper. If the sectors are too narrowly defined then potential projects which lie on the interface of different sectors may 'fall between stools', whilst new and truly innovative entrepreneurial opportunities which lie outside of these sectors may be found to be ineligible. Equally, the defined sectors should form the focus of the programme until 2020, which may require some adaptive flexibility. If, however, the nine sectors are too broadly defined, this would raise the question of the added value of the prioritisation exercise as it would be difficult to identify what is excluded. HEW would stress that future programmes should have the ability to support promising new emerging areas of activity, as this may form the basis for future economic growth.

If some form of prioritisation is desired, HEW suggests that the Welsh Government make a direct linkage between the priorities of *Horizon 2020* and the European Programmes in Wales, allowing a clear alignment between the operational programme for the next round of structural funds and the societal challenges prioritised in *Horizon 2020*. This would enable Welsh firms, universities and research bodies to collaborate around European policy priorities and encourage an outward looking perspective. Moreover HEW would encourage the programme authorities to look to the Innovation Strategy being developed and the implications of the call for the ERDF Programmes to adopt a 'Smart Specialisation' approach. Targeting a proportion of funds available through the European Programmes in Wales on a small number of 'specialisations' could be advantageous in terms of securing a critical mass of activity, and on raising the profile of this activity to firms in Wales and those located outside of Wales. The value of this would be enhanced where this was part of a wider strategic approach.

- **Concentration of Resources**

HEW welcomes the consideration of the spatial concentration of resources and notes the commitment to a city-region approach in the new programming period. HEW encourages Welsh Government to ensure that Welsh towns and cities are able to take full advantage of any initiatives which will be introduced to support this agenda. By generating world class research, often based on investment in research infrastructures and in collaboration with business, and educating highly skilled graduates, universities play a central role in city-region development. They attract the best talent and businesses to a specific knowledge cluster which in turn attracts further investment. This central role should be reflected in any Welsh policy development, funding priorities and actions. HEW would query the point in the Reflection Exercise that questions that ERDF and ESF are more attuned to urban or city aspects (Section 5) and would argue that knowledge, innovation and higher-level skills development applies across Wales and throughout the funds.

HEW would support moves towards exploring opportunities offered by Joint Action Plans for strategic themes such as research and innovation. The experience of the more strategic approach adopted in the ERDF and the ESF programmes (2007-13) has been generally positive. As a sector, HEW believes that strong lessons can be learnt from the experience of the current programming period and these should be adopted in the new programmes. We would recommend that this be considered for the EAFRD and EMFF programmes in the future.

HEW is concerned that the Reflection Paper suggests a myriad of approaches to the concentration of resources in future European programmes in Wales. These include the thematic concentration of resources, spatial concentration of resources and the sectoral concentration of resources. Whilst each has merit, there is a danger of seeking to spread

available resources too thinly and of making the implementation process inherently complex. This might undermine effective implementation.

- **European Territorial Cooperation Programmes**

HEW welcomes the interest taken in the European Territorial Cooperation Programmes. These merit a more significant role in developing wider policy objectives in Wales. Welsh Universities have a strong record of engaging in ETC programmes and, in the best cases, HEW recognises the value that they can bring in developing collaborative projects which serve to widen the knowledge base available to Welsh institutions and to Welsh businesses. Consideration as to how these programmes might be used in innovative ways to develop strategic contacts and collaborative capacity for future economic growth and prosperity, should be taken.

- **Private Sector Engagement**

The importance attached to engaging the private sector in future European Programmes in Wales is supported by HEW. The sector has been successful in engaging with firms through collaborative arrangements and in knowledge exchange initiatives. Few SMEs have the resources to manage the bureaucratic and administrative procedures which European funding programmes entail. Eligibility definitions can also artificially constrain private sector involvement in projects. The sector is actively strengthening the engagement of the private sector in the European programmes by taking responsibility for these administrative procedures. In many of the projects, the private sector is involved in the development of the project, even though it does not lead. HEW does not regard the number of projects led by the private sector to be a robust measure of engagement and suggests that this approach is not pursued further. Further engagement of the private sector would be further encouraged by removing unnecessary burdens of participation from private sector partners wherever possible and by building the capacity of SMEs to engage over time.

- **Measures of Success**

The new European Programmes offer an opportunity to consider how the progress and performance of both programmes and projects are best monitored. Lessons have been learned in the delivery of the current programmes, one of which is that simple transactional indicators such as jobs created and businesses assisted, are not always the most appropriate measures of projects which are aimed at research, innovation and transformative change. HEW feels that projects are already attuned to emphasising results and outcomes but that some programme level indicators are misaligned with the stated aims of particular priorities. This can cause some perverse effects as projects seek to meet their output obligations.

The draft Regulations provide valuable suggestions of potential future measures of success. HEW recommends that any measures adopted should recognise that the European

programmes are seeking to build long-term capacity for knowledge generation and absorption. This will not always provide innovation and employment gains within the reporting period. Equally, the upskilling of the population is likely to provide results over the longer term. Any measures adopted should recognise the timescales over which results and impacts will be realised.

In the current EU Programmes, the cost of procuring and delivering external evaluation for each project is significant. If carried out effectively, these evaluations should provide an assessment on how projects have met their objectives but it is not clear whether the results of these evaluations will feed into the overall evaluation of the EU Programmes once they have been completed.

- **Linkages and Implementation**

Looking more widely, Welsh Universities would welcome a greater cross-linkage between the Structural Fund programmes in Wales and other EU programmes. It is noted that this is also an objective of the Commission. For Higher Education, this will clearly focus on synergies between the Structural Funds and *Horizon 2020*. These opportunities fall in the areas of research, innovation and skills development.

HEW emphasises that in preparing for the 2014-2020 round of European Programmes, due consideration should also be given to implementation issues. The success of the future programmes will depend upon efficient and timely implementation, on minimising associated bureaucracy and on maximising the potential value of the available funds to Wales. In particular, it is important that the slow start to the programmes for the 2007-13 period is not repeated.

6. Conclusion

The 2014-20 programming period offers an opportunity to transform the economy of Wales. It will operate in a starkly different economic context to that which prevailed at the start of the current programming period. Economic austerity, cuts in public sector expenditure and challenging global market conditions require the sector to stimulate entrepreneurial capacity across our universities and equip society with the skills both to compete in the global economy and to contribute to increased productivity in Welsh businesses.

It is crucial that we use the resources available to develop a resilient economy and lay the foundations for long-term economic prosperity. Efforts should be focused on building the capacity for research and innovation, developing business competitiveness and promoting higher level skills, whilst developing a resource-efficient low carbon economy. It is crucial that the European Programme resources are not used for well-meaning, short-term ends but rather looking towards securing the transformation of the Welsh economy over the longer

period. Taking time through the strategic projects approach, the long-term impacts of future European programmes will be worthwhile.

The Higher Sector in Wales is pleased to have had the opportunity to respond to this Reflection Exercise. The Higher Education sector is a significant player in fundamental aspects of the European programmes in Wales and welcomes opportunities to share experience and to be involved in further discussions on the development of these programmes in Wales.

**HIGHER EDUCATION WALES
JANUARY 2012**

Annex 1

Expanding International Capacity Through the Structural Funds

The following projects offer a few examples of where Structural Fund investments have laid the foundations for future collaborations and drawn down national and EU research and innovation funding.

DIPLE (Printing & Coating)

Funded through the ERDF Objective 1 in 2004, this project was led by Swansea University. The project aimed to match companies to growth areas identified by the Printing and Coating Forum Strategic Summit. The 5 technological areas forecast to grow are: Digital Technology and Colour Control, Industrial Printing, Packaging, Lean Manufacturing and Environmental Improvement. An integral part of the project was the development of strategic marketing support with the target companies in order for them to realise their full potential. From this work the FAST2LIGHT FP7 project has been developed. Funded by the EU's FP7 programme this project explores high-throughput, large area and cost-effective OLED production technologies. Consisting of a partnership of 13 partners from 8 countries with investment of more than €10m this project develops the international reputation expertise now present in Swansea University.

Centre for Nanohealth

Located at Swansea University the Centre for Nanohealth was begun in 2009 with support from the ERDF Convergence Programme. The project aims to establish the region as a world leading interdisciplinary centre offering a Research and Development, Demonstration and Deployment, and Skills innovation system for NanoHealth. It aims to promote Welsh SMEs to work on the development of new healthcare technologies from initial concept to the point where they can be deployed commercially. The AMETHYST project, funded by the EU's FP7, programme has since been developed through the Centre. Bringing together 8 organisations from across 6 countries this project is developing novel approaches to wound treatments which offer cost and safety benefits over current techniques.

Gas Turbine Research Centre

Cardiff School of Engineering's Gas Turbine Research Centre was in receipt of a £3.8 ERDF grant between 2006-2008 under the ERDF Objective 1 programme to relocate and upgrade two large-scale combustion rigs donated by international technology company QinetiQ, who selected the School of Engineering as the recipient ahead of several other EU contenders. The Centre conducts research into more efficient fuel utilisation, alternative fuels and reduction of pollutants such as Nitrogen Oxide and fine exhaust particulates in power generation and aircraft turbines. Since its opening in October 2007, the GTRC has delivered a number of commercial contracts, involving Welsh companies, as well as participated in EU FP7 funded collaborative projects. The Centre's participation in FP7 funded projects 'H2-IGCC' (funded under FP7-Energy theme) and 'BRISK' (funded from FP7-

Capacities/Infrastructures theme) have brought circa £700K of research grant income to date.

SWINGS

Cardiff School of Pharmacy was a key collaborator in an INTERREG Ireland-Wales IIIA project 'SWINGS' (Separations, Wales & Ireland – Novel Generation Science) lead by the Waterford Institute of Technology. The key objective of the SWINGS project was to identify and carry out laboratory research in emerging separation science techniques. This research involved the development of novel extraction and purification media for pharmaceutical and environmental applications and led to valuable collaborations with SMEs operating in this area both in Ireland and Wales. The SWINGS project has since lead to a successful bid to the FP7 Industry-Academia Partnerships and Pathways scheme for a new HIPODERM project (grant value of around £700K), which looks into skin cancer drugs using the microneedle technology developed at the Welsh School of Pharmacy. The four year project combines expertise from the School of Pharmacy, the Welsh company An-eX Analytical Services and two Irish partners, the Pharmaceutical and Molecular Biotechnology Research Centre at Waterford Institute of Technology and the company EirGen Pharm