

Technology Strategy Board  
Driving Innovation

# Delivery Plan

## Financial year 2011–12



# About our programmes

Business, rather than the Technology Strategy Board, is the source and delivery agent of innovation. We offer a range of programmes, each with different strengths, to support businesses on the innovation journey.

- **Research, Development and Demonstration**

Funding for projects from small proof-of-concept grants and feasibility studies through to large multi-partner collaborative R&D and demonstration projects. The businesses we support range from pre start-up, start-up and early stage micro businesses, to large multi-nationals. There are different models depending on the specific needs of companies, sectors and technologies. These include:

1. **Grant for R&D:** this single-company scheme is open to applications at any time for pre start-ups, start-ups, micro businesses and SMEs
2. **Feasibility studies and collaborative R&D:** these competitions are open to applications from single companies and business-led consortia for innovative projects in specific technology areas or to meet particular challenges identified as a priority for the UK
3. **Demonstrators:** these competitions invest in business-led projects to demonstrate new products or services in the real world and at scale.

See the latest competitions here:  
[www.innovateuk.org/competitions.ashx](http://www.innovateuk.org/competitions.ashx)

- **Technology and innovation centres**

A new network of physical centres designed to achieve critical mass and global impact, enabling business to use the best technical expertise, infrastructure and equipment to help accelerate the route to commercialisation. Get involved here:  
<https://ktn.innovateuk.org/web/technology-and-innovation-centres-forum>

- **European and international activities**

Help for business to access EU programmes for R&D and innovation, and support for high-tech SME participation in Eurostars with other innovative SMEs from across Europe. We also support opportunities for SMEs in priority areas such as low carbon, digital and healthcare to connect with investors and potential collaborators in the US, with plans to extend to other countries.

[www.eurostars-eureka.eu](http://www.eurostars-eureka.eu)

- **SBRI (Small Business Research Initiative)**

This initiative provides public sector procurement contracts to business for R&D to develop new products and services. The business gets finance to develop its ideas in conjunction with a potential purchaser and the public sector gets more innovative solutions to deliver better services.

See the latest competitions here:  
[www.innovateuk.org/competitions.ashx](http://www.innovateuk.org/competitions.ashx)

- **Knowledge Transfer Networks**

A dynamic resource for individuals to enable business innovation by sharing knowledge, ideas and opportunities within and between specific sectors. There are also special interest groups set up to work across KTNs on specific tasks.

All of the networks are now hosted on [\\_connect](http://_connect) at <https://ktn.innovateuk.org>

- **Knowledge Transfer Partnerships**

A well-established programme which stimulates business innovation by drawing on the expertise in UK universities and colleges; companies work with recently qualified individuals on challenging projects which transfer knowledge into the business  
[www.ktponline.org.uk](http://www.ktponline.org.uk)

- **Missions**

Support for missions, in which the pick of innovative UK companies in areas such as web, healthcare or clean technology travel to the US to make new connections and meet potential investors, suppliers and customers.

[www.cleanandcoolmission.com](http://www.cleanandcoolmission.com)

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# Foreword

The Technology Strategy Board incentivises business innovation across the UK; our job is to help make innovation happen.

The country's ability to innovate is key to economic growth. Over the first years of this century, UK private sector productivity growth has been hugely dependent on innovation. The competitive advantage of UK plc depends on effectively managing and commercialising the knowledge we have.

The world also faces major challenges – climate change, limited natural resources, and changing age demographics. The drive towards a more sustainable way of living is creating global market opportunities for entirely new solutions. We can only meet these new needs with innovation.

So what needs to be done? Of course UK businesses invest heavily in innovation and this investment dwarfs what Government invests. But we can't expect businesses to bear the brunt alone. For example, returns on investment in new technology are uncertain; small and early stage companies can struggle to find finance or partners. Innovation can upset supply chains, requiring new partners and technologies. It can be difficult for businesses to react to opportunities. If the UK is to achieve its economic potential we cannot just hope innovation will happen, we must help make it happen.

This delivery plan sets out how we are implementing our new corporate strategy *Concept to Commercialisation* and also reflects the new responsibilities for this spending period to 2015. With funding of over £300 million per year, we have ambitious plans.

Setting up the new network of technology and innovation centres is one of our key commitments. The technology and innovation centres programme is one of the most exciting developments for UK innovation in recent years. It will help to harness this country's technical strengths and make us a global leader in some of the key areas of future growth, benefitting everyone working in those fields.

So far, we have announced three, focusing on high value manufacturing, cell therapy and offshore renewable energy, with the high value manufacturing centre set to open during this financial year.

Our other key commitments over the next four years are: creating a co-ordinated package of support for SMEs; continuing to focus on developing the role of government as a lead customer making public procurement a force for innovation; more investment in large-scale demonstrator projects such as the

DALLAS programme focusing on the challenge of enabling people to live independently for longer; and finding new ways to bring people with ideas and resources together.

What is clear to me from our first few years is the convening power we have built up. We are much more than just a funding body. We have been able to bring together people and organisations with different perspectives and resources, in business, research and government, and to break down barriers and make new things happen.

For this country to reach its innovation potential will need us all to continue to work together in this way. Together, we can help build a bright future for the UK – as a global leader in economic growth based on innovation.

**Iain Gray**  
Chief Executive

# Introduction

In May 2011 we published our new corporate strategy *Concept to Commercialisation* which set out our four-year plan.

The document expands on our first strategy, *Connect and Catalyse*, and reflects new responsibilities and the development of our thinking.

Our budget for 2011-12 to 2014-15 is more than £1bn. In partnership with business and other funders, this will generate investment of around £2.5bn to drive economic growth.

Our strategy for business innovation support over these years concentrates on five areas:

- accelerating the journey between concept and commercialisation
- connecting the innovation landscape
- turning government action into business opportunity
- investing in priority areas based on potential
- continuously improving our capability.

This delivery plan explains how we are implementing *Concept to Commercialisation* during 2011-12 (ending 31 March) and introduces the work we will do over the next four years.

As is the nature of a one-year snapshot of a four-year plan, some programmes reflect a great deal of investment and activity while others are just starting up or reaching maturity.

We aim to be responsive to the fast-changing needs of the global economy and to take advantage of opportunities as they emerge, so we may change our plans and develop new ones during the year. Such changes might typically include the launch of new competitions, such as the pilot Tech City Launchpad, or a new working partnership which brings the potential for further funding, such as the Medical Research Council joining the Knowledge Transfer Partnerships programme.

Any information about new developments will be communicated through our website [www.innovateuk.org](http://www.innovateuk.org) and through the [\\_connect](http://_connect) online networking platform.



# Delivering the *Concept to Commercialisation* strategy

## Accelerating the journey between concept and commercialisation

The journey of an idea from concept to market is uneven and indirect.

There are many obstacles and possible entry and exit points, and support for business innovation is too often unconnected.

We will work with business to ensure that our programmes offer the best possible support at appropriate stages of the journey, building our shared understanding of the innovation journey and the support needed for different business types, sectors and development stages.

### Technology and innovation centres

A key commitment over the next four years is the establishment of a network of world-leading technology and innovation centres in specific fields. In 2011 work is progressing on the first three centres in high value manufacturing, cell therapy and offshore renewable energy technologies.

**Target:** First centre in high value manufacturing to open by the end of October 2011.

**Target:** Identify the most appropriate organisations to establish and run the cell therapy and offshore renewable technology and innovation centres. Work with resulting successful organisations to open the centres during the first quarter of 2012-13.

**Target:** Build communities through the Knowledge Transfer Networks and **\_connect** and work with them to identify the next three centres by the end of the financial year.

**Target:** Communicate widely about the centres and their vision, to ensure businesses and other innovators know what they are and how they can use them.

### Support for high-potential SMEs

Small and medium-sized enterprises (SMEs) will be a major source of the UK's future economic growth. We help SMEs in a number of ways, such as:

- working with them – through collaborative R&D, building supply chain relationships and linking to the marketplace
- supporting their R&D while connecting to a lead customer – the SBRI programme provides a development contract with a public sector customer to take an innovation forward
- enabling them to access the research base – the Knowledge Transfer Partnerships (KTP) programme brings a recently qualified person into a business to use their knowledge – with the backing of the research base – to take the business forward
- developing European partnerships – Eurostars enables and helps to fund UK firms to collaborate with EU companies

- funding feasibility studies – through open competition companies can gain funding and opportunities to network with investors.

We have recently introduced programmes aimed at supporting the development of geographic clusters of SMEs (Launchpad), and to fund proof-of-market, concept and prototype projects (Grant for R&D). We have also developed existing programmes further, for example in the KTP programme piloting the use of thematic KTPs and seeking out new funding partners.

During 2011-12 we will review the overall support we offer and improve it by developing a more coherent package of support with a focus on:

- access to finance
- access to partners and supporting clusters
- access to intelligent lead customers
- access to knowledge and skills.

**Target:** To launch the support package across the UK during 2011-12 to help early stage entrepreneurial businesses to accelerate their ideas more rapidly to market and, for more mature businesses with potential, to deliver strong growth.

### Raising awareness

SMEs are often time and resource poor and find it difficult to navigate their way to the right support through the current complex maze of support provided by the public and private sectors. The changing innovation landscape in the UK, such as the abolition of the regional development agencies and physical Business Links, and the creation of Business Coaching for Growth provides new challenges and opportunities.

**Target:** To raise awareness of our programmes among highly innovative SMEs through communications including better signposting to our own and partner programmes through online and other channels, and outreach work.

### New forms of knowledge exchange & networking

Online social networks bring people with ideas and resources together. Our 15 Knowledge Transfer Networks also provide us with the means to work directly with disparate communities of businesses and researchers to develop new programmes such as the technology and innovation centres, and our thematic strategies. We continue to seek to improve the efficiency and effectiveness of these networks and the online platform where they are now hosted.

We will develop our online platform **\_connect** – the new 'home' of our Knowledge Transfer Networks – to maximise its impact as a place where individuals and businesses can find partners, build collaborations and work on challenges on the road to commercialisation.

**Target:** We aim to have a critical mass of 60,000 members of **\_connect** by year-end.

**Target:** To increase cross-network activity and open innovation between the Knowledge Transfer Networks through a 1-2-1 matching function that will help members from disparate research communities or business sectors find one another on **\_connect** and collaborate.

It has been recognised that direct face-to-face networking is a powerful tool to enhance innovation initiatives across national and local organisations and we will work to leverage this further.

**Target:** To review and develop stronger links between our national innovation events (including our flagship Innovate event) and networks, to the new Local Enterprise Partnership organisations, the devolved administration innovation networks and subnational innovation bodies.

## Connecting the innovation landscape

The range of players creates an innovation landscape that is often fragmented and difficult for business to navigate.

Broadening our role nationally and internationally, we will build and strengthen mutually beneficial strategic relationships with other UK organisations, to help join up the landscape and create a more effective innovation environment for business.

### At home

Specifically this includes working with the research councils, the wider research base (including funding bodies, universities, public and private sector research organisations), UK Trade & Investment, the Intellectual Property Office, the Design Council, NESTA, and other public and private sector bodies.

We already have strong working relationships which we will enhance, aligning our programmes to support innovation where appropriate. And we will work with the new Business Coaching for Growth scheme as it is developed and conduct further outreach with the financial investment community.

**Target:** To enhance our understanding and work in partnership with the research councils and the wider research base, to maximise the impact of our joint work and investment for business. To build joint programmes with agreed metrics with these partners in priority areas to increase impact and to feed back into future research agendas.

**Target:** To establish an agreed way of working with the emerging Business Coaching for Growth scheme to ensure that we can work in partnership to provide 'joined-up' support for businesses.

#### And abroad

The EU is the world's largest 'home' market. This creates many business opportunities for UK companies – covering access to world leading research, partners, customer and markets. EU R&D support programmes also represent an opportunity which dwarfs most national support schemes. We will work to identify where EU engagement can enhance our programmes and also help business to benefit from EU and international opportunities.

**Target:** To include the potential and benefit from EU and international interaction in all of our thematic programme strategies

**Target:** To review support provided to companies wanting to identify and access appropriate EU support – review the role of National Contact Points, the effectiveness of online support, and create a Brussels presence to improve the two-way flow of information.

We will develop a joint programme of work with UK Trade & Investment to support missions to the US, taking innovative UK companies to meet potential investors, suppliers and customers.

**Target:** To enable innovative UK firms to boost their business potential by meeting US contacts in the Clean and Cool mission early 2012.

We also link into other networks within government such as the global Science and Innovation Network, continue to work with the EU PRO-INNO initiative and The Association For Technology Implementation In Europe (TAFTIE) for intelligence gathering and networking as well as reviewing best practice and benchmarking.

**Target:** To review best practice and benchmark our programmes and assess our performance in the context of a globally competitive environment.

We recognise that it can be difficult for businesses to navigate the public sector when they are looking for support. To help 'join up' the landscape we will use communications strategically, targeting the UK's most highly innovative companies – to ensure they know who we are and how we might be of use to them in progressing their ideas.

**Target:** To ensure that the most innovative firms across the UK know how to tap into the support that we offer, through the strategic use of communications, including the media, web, events and publications.

## Turning government action into business opportunity

The actions of government departments and agencies can change markets and create opportunities for innovative businesses. We will work with government to identify areas where policy, procurement, standards, and the use of regulation can stimulate business innovation.

We will continue to develop our innovation platforms and programmes, working across government on areas where government action and/or societal challenges will create business opportunities companies in the UK.

#### Procurement

The UK government is the largest single purchaser in the UK and yet little of that purchasing power is currently directed at supporting innovation and economic growth.

How the public sector behaves towards its suppliers can do much to foster and support innovation. There is wide recognition that there is significant potential to use public sector procurement to drive innovation. There are however major cultural and process issues to overcome to turn the potential into reality. We will continue to develop this potential and the role of government as an intelligent lead customer.

**Target:** We aim to further expand the SBRI programme against a backdrop of tight public spending, to initiate more than 32 competitions (or a 10% increase).

**Target:** To work with the emerging new NHS structure to ensure that innovation is promoted and supported and to develop the role of the NHS as an intelligent lead customer.

**Target:** To work within Europe to develop and deploy an EU version of the SBRI scheme.

**Our role as a delivery partner**

We will act as an effective, pro-active and trusted delivery partner, helping other government organisations and devolved administrations to maximise the impact of their support for innovation.

**Target:** To further develop effective delivery partnerships with the UK and European space agencies, the Department for Transport, and the Department of Energy and Climate Change, and to deliver co-funding and aligned activities from these through the year.

Space can increasingly be seen as an important potential source of economic growth, social wellbeing and sustainable development. We aim to be an effective and valued partner with the UK Space Agency and the European Space Agency (ESA) to enable the development, commercialisation and exploitation of space technologies and services based on space data.

The Space Innovation and Growth Strategy (available at [www.bis.gov.uk](http://www.bis.gov.uk)) highlights the opportunity for the UK to capture 10% of a global market forecast to be worth £400bn in 2030. The Technology Strategy Board's role is to:

- provide opportunities for technology and service demonstration (removing a key barrier to market)
- drive innovation within the sector and new collaborations across other growth sectors (using collaborative R&D competitions and ESA programmes)
- support enterprise and entrepreneurship in space technology and services (working with our Space Special Interest Group on **\_connect** and the International Space Innovation Centre).

In 2011-12 we are supporting the establishment of the International Space Innovation Centre and will launch a co-funded collaborative R&D competition in October 2011. The competition is co-funded by the UK Space Agency (£6m) and the South East of England Development Agency (SEEDA, £0.5m).

**Target:** To run a collaborative R&D competition in space with co-funding from the UK Space Agency.

**Innovation platforms**

We undertake research to look into the case for setting up innovation platforms where government action in a specific area may indicate that a joined-up programme of work would benefit the industry and the innovative businesses within it. In 2011-12 we have been looking into water and technology-enabled learning. See the next section for further information.



# Investing in priority areas based on potential

We are developing our thematic programme to focus on areas that address global challenges and market opportunities, complemented and supported by innovation in competencies and enabling technologies

We also work to ensure that our portfolio reflects synergies between these areas; and that there is a balance of investment in new products, new processes, new services and new business models. In making our investments we apply four criteria to target sustainable UK economic growth:

- is there a large (global) market opportunity?
- does the UK have the capability to develop and exploit the technology?
- is the idea 'ready'?
- can the Technology Strategy Board make a difference?

To answer these questions we develop thematic strategies in consultation with industry, academia and government. These strategies inform our investments and implementation plans for the following years.

During 2011-12 we are initiating the process of refreshing and redeveloping our thematic strategies, some of which will be published during the year. Business, academia, government and members of the Knowledge Transfer Networks and their related special interest groups are involved in this process and will help develop our thinking.

**Target:** To publish strategies covering energy; transport; high value manufacturing; advanced materials; biosciences; electronics, photonics and electrical systems; and information and communication technologies.

As the Government continues its growth reviews and develops the Innovation and Research Strategy, we are working to provide input into key policy areas and sector plans, and to ensure that our own work aligns with them where possible, and as such is reflected in our thematic strategies.

**Target:** Working with the Department for Business, Innovation and Skills, provide input into all aspects of the Innovation and Research Strategy.

## Demonstrator projects

Large-scale demonstrators help to overcome barriers, bringing partners together to test and validate what can be done, and so move new products closer to wider application. We have enabled highly effective demonstrators in sectors such as low-carbon vehicles and home retrofit, and are now launching a major demonstrator programme within the Assisted Living Innovation Platform.

The work of the four-year £23m DALLAS (Delivering Assisted Living Lifestyles at Scale) programme begins with a community-building

exercise. The community of users will work within the demonstrator programme to show how assisted living technologies and services can be used to promote well-being and provide top-quality health and care, enabling people to live independently.

**Target:** Establish up to five communities of at least 10,000 people each for the demonstrator work as part of the launch of the DALLAS programme.

## Collaborative R&D

One of the main ways in which we drive business innovation is by running open competitions for collaborative R&D funding. During 2011-12 we expect to launch 50-60 competitions, mostly focusing on specific thematic areas. The details of these competitions are in the following thematic sections.

We also run more general 'technology-inspired' competitions which have a broad scope within targeted technology areas.

**Target:** To run a third 'technology-inspired' competition with up to £15m funding across the enabling technologies of biosciences, advanced materials, electronics, photonics and electrical systems, and ICT, in October 2011.

## Sustainability

The world faces major issues which must be addressed, such as climate change, limited natural resources, and changing age demographics. The need to move to a more sustainable economy is creating global market opportunities. The countries that can innovate to find sustainable solutions most rapidly will be most likely to benefit.

The effective use of resources, energy and social capital is a pre-requisite for long-term economic success. Those businesses that can manage these successfully are likely to have the most staying power. The challenge is to introduce the 'triple bottom line' of environmental, social and financial sustainability from the start.

Many of our programmes have a clear theme of environmental or resource sustainability as a driver of innovation, and about two-thirds of the projects we fund have a sustainability objective, but we need to incorporate sustainability principles into everything we do.

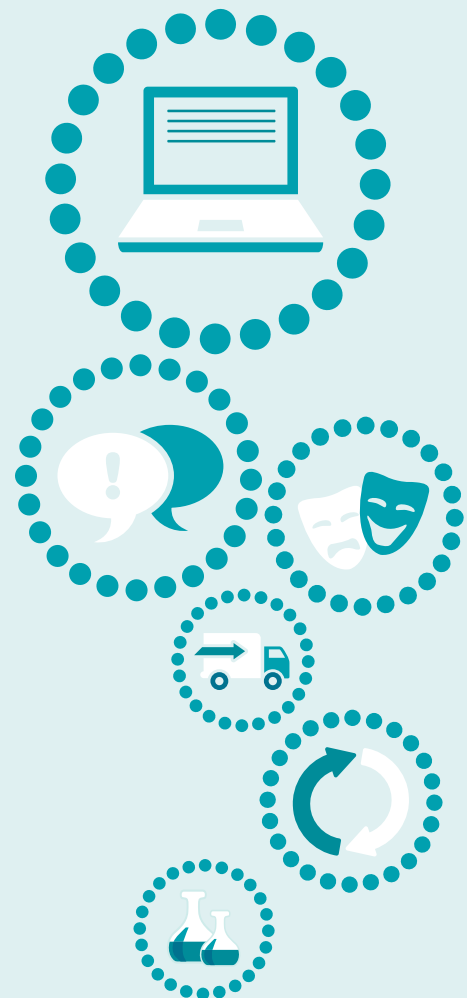
We are developing a sustainability framework with Forum for the Future to help:

- evaluate the candidate technology and innovation centres
- refresh our technology strategy
- evaluate potential new areas of investment under development.

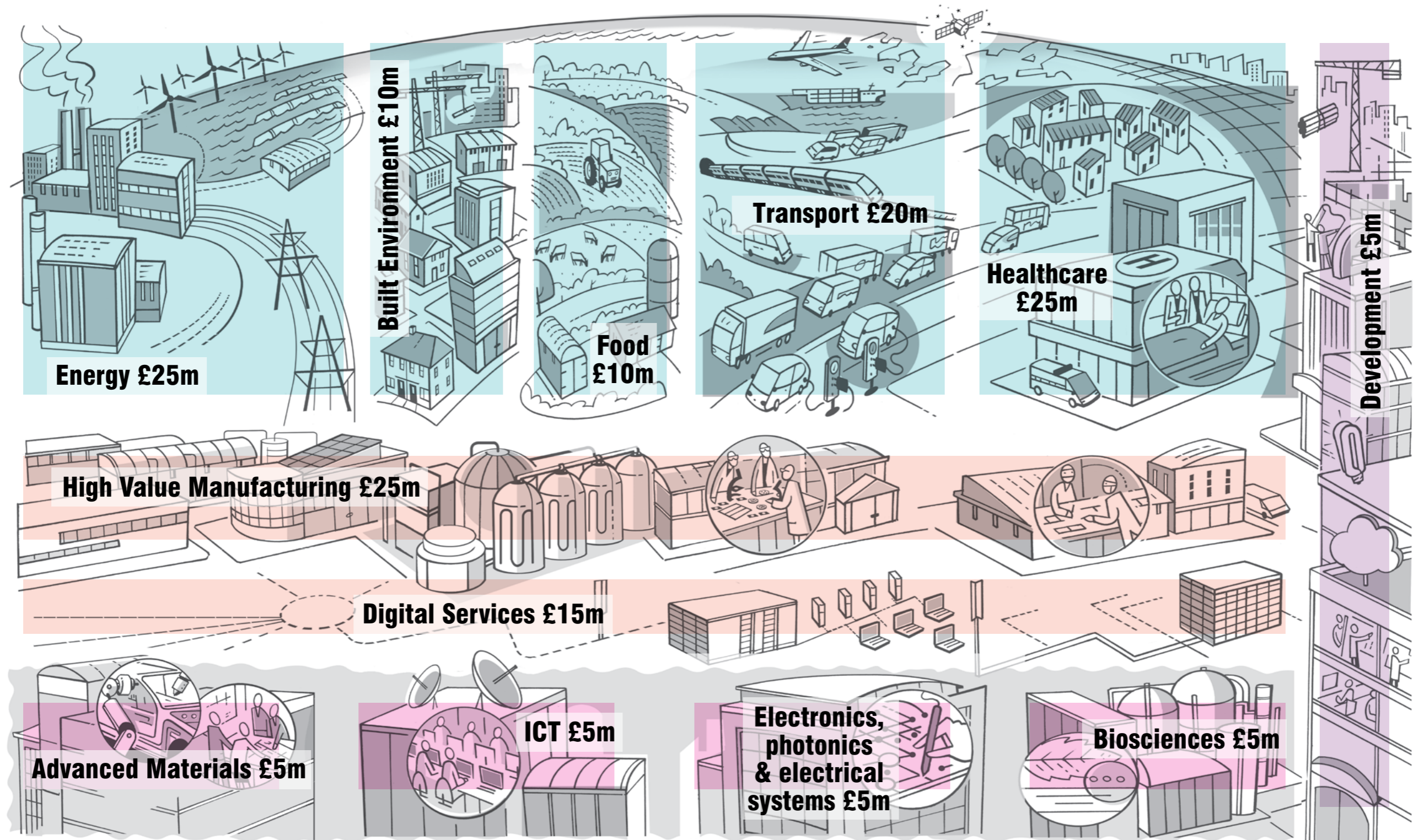
Some of our programmes clearly have sustainability at their core and do not fit into a single priority area.

For example, during this financial year we are running a dedicated collaborative R&D competition, 'Resource Efficiency: Supply chain innovation', with up to £4.5m in funding to help industrial end-users work with supply chains and innovators to create new products and services.

As a result of our research into the innovation opportunities for water we decided not to set up an innovation platform for this area but to launch a competition to support the UK water industry in overseas markets. Our interim strategic assessment provides more insight into our thinking (at [www.innovateuk.org](http://www.innovateuk.org)) and we will be launching a water special interest group to help develop it further.



# Anticipated in-year expenditure in 2014-15, by priority area\*



\* Note that the figures quoted on this illustration are indicative only and subject to change over the spending period.

# Challenge-led areas

## Energy – cutting carbon emissions and accelerating the renewables market

### Opportunity

In many areas, the UK is leading technology development, such as in wave and tidal generation devices, or in providing leading markets and supply chain capabilities such as in offshore wind turbines. To take advantage of these opportunities, we aim to provide businesses with the means to profit from global energy policies and regulation with a particular focus on the UK Government's 2020 and 2050 low-carbon energy targets and the need for an indigenous, secure and affordable energy supply.

### Challenge

We aim to accelerate the development of technologies that tackle:

- the requirement for 15% of total UK energy to come from renewable sources by 2020
- the requirement for UK CO<sub>2</sub> emissions to fall by 18% between 2008 and 2020 (cf 2008)
- the security of an estimated 85GW supply requirement in the UK by 2020
- the provision of affordable energy for all.

### Action

Over the next four years we will focus on the following key areas:

- offshore renewable technologies
- fuel cells and hydrogen
- carbon abatement technologies
- future grid and digital energy.

### In 2011–12

#### Action

- Establish a technology and innovation centre in offshore renewable energy technologies

- Collaborative R&D competition November 2011  
Disruptive carbon abatement technologies and post-feasibility demonstrators – up to £4.5m

- Collaborative R&D competition January 2012  
Fuel cell whole system integration and demonstration – up to £7.5m

- In development: Collaborative R&D competition  
Marine array deployment

- In development: Collaborative R&D competition  
Distribution automation and demand-side management feasibility studies

- Research and consultation for refreshed strategy through knowledge transfer networks and others

#### Target result

- A national focus for joint work between business and the research base and a critical mass of activity to benefit the entire offshore energy sector

- The UK has a stronger position in the global carbon abatement market where regulation and legislation is driving significant business opportunities

- Demonstration of the role of hydrogen and fuel cells in end-to-end systems in order to validate the economic viability and environmental sustainability of hydrogen and fuel cells in the future energy mix

- Deployment of new technologies de-risked by breaking common technical barriers to scale demonstration

- Early-stage solutions to the challenges of dynamically matching supply with demand are developed

- Strategy published by the end of the financial year

## Built environment – the climate is changing and so must our buildings

### Opportunity

Buildings are responsible for more than 40% of UK carbon emissions. Our existing building stock performs poorly, giving many opportunities for carbon reduction through innovative products, processes and collaborations.

The Climate Change Act (2008) sets reduction targets that offer industry tremendous opportunities. UK legislation on tackling climate change has been described as world leading, sending a strong message to the market. This situation also provides significant global opportunities for businesses; as we drive innovation at home, our skills will be in demand overseas.

### Challenge

The Government has been working hard to identify the key challenges for the construction industry. But the task is daunting; construction industry output is greater than £100bn pa and it employs 10% of the UK workforce. Changing practices to significantly reduce carbon emissions is a mammoth task.

### Action

We take an action-based approach on the basis that if we can demonstrate the value of change we can present a much more compelling case. During this year we are continuing our Design for Future Climate, Building Performance Evaluation, and Retrofit for the Future programmes, which all involve a high degree of demonstration work.

As well as tackling buildings, we need to consider carbon emissions at a community scale. Towards the end of 2012 we will start to look at sustainable infrastructure.

### In 2011–12

#### Action

- Collaborative R&D competition May 2011  
Design for future climate 2 – up to £2.4m

#### Target result

- Effective strategies to tackle adaptation to climate change in building design are available to the industry

- Collaborative R&D 2010–2012 rolling programme of competitions  
Building performance evaluation – up to £8m (over the programme period)

- A large body of data is available on the performance of many different types of building, using a wide range of materials, types of occupants, in a spectrum of industries etc – to be used by industry

- EU competition 2011  
Eracobuild: Scaling up retrofit – up to £1m

- Work with EU partners provides new ways to scale up retrofit and cut costs

- Collaborative R&D competition January 2012  
Build process – up to £2.5m

- Industry has new ways to construct buildings that deliver their designed performance and meet occupant expectations of comfort, security and quality

- Set up a special interest group on **\_connect** to look at 'electric-efficient buildings'

- Working with three knowledge transfer networks, and the businesses and researchers that join the group we discover whether electricity from on-site renewals can be supplied as DC to electrical equipment to reduce losses, and shift peak loads

- Research: retrofit triggers

- Research into market, consumers and incentives provides intelligence to take retrofit to the next level

## Food – upping productivity while reducing environmental impact

### Opportunity

Population growth and rising affluence in the developing world is set to drive a 75% increase in global demand for food over the next half century (UN FAO 2008). Against a backdrop of climate change and natural resource depletion, this poses a significant challenge to the world's food system that will require a quantum leap in sustainable food productivity. The UK has a world-class research base and some of the most dynamic and innovative companies in the global food supply chain from biotechnology, animal and plant breeding, through engineering and primary agriculture to food manufacturing, distribution and retail. The opportunities for UK business are immense.

### Challenge

To enable innovative businesses to take advantage of global demand growth we aim to accelerate the development of technologies in:

- crop productivity
- sustainable livestock production
- reduction of waste throughout the food supply chain
- reducing the environmental impact of agriculture and food production.

### Action

Over the next four years we are working in the following areas:

- food manufacturing and supply chain efficiency
- trait measurement and phenotyping
- integrated farming systems
- engineering innovation.

### In 2011–12

#### Action

- Collaborative R&D competition April 2011 Sustainable protein production – up to £16m with funding from Defra, BBSRC and the Scottish Government

#### Target result

- Projects enable domestic supply of sustainably produced vegetable protein for farmed animals and fish to increase. Conversion efficiency in animal production systems is improved and waste in the food chain to the point of sale is reduced

- Working with Agriculture and Horticulture Development Board, NFU and Royal Agricultural Society of England and other partners to develop a technology roadmap for agriculture early 2012

- An agreed roadmap is developed and published

## Transport – enabling integrated, sustainable and profitable systems

### Opportunity

The UK has a strong transport industry with significant capabilities in the aerospace, road, rail and marine sectors as well as newer capabilities in intelligent transport systems. Transport is responsible for about 25% of the UK's carbon emissions and congestion in our transport system is set to cost the economy £22bn by 2025. The transport (manufacturing) sector in the UK employs more than 1.3 million people directly, has a turnover of more than £123bn and provides nearly £40bn of GVA. The UK has key R&D activities in the automotive and aerospace sectors and is well-placed to develop and commercialise innovations that meet the demands of future transport in the areas of energy management, carbon reduction, integration and mobility.

### Challenge

The impact of growing demand for transport in terms of environment, energy use and efficiency demands a transformation in performance to deliver a sustainable transport system.

### Action

Over the next four years we will work on vehicle-specific activities, moving towards integration activities to improve the overall system. Work needs to be done to understand the value of integration and the business models that are needed to ensure engagement by the various players.

### In 2011–12

#### Action

- Collaborative R&D competition November 2011  
Accelerating Innovation in Rail – up to £2m + £2m from RSSB
- Collaborative R&D competition December 2011  
Disruptive technologies in aerospace – up to £5m
- Collaborative R&D competition January 2012  
Integrated Delivery Programme 7 vehicle technologies – up to £7m + £9m from the Office for Low Emission Vehicles
- Collaborative R&D competition January 2012  
Fuel cell demonstrator – up to £1.5m
- Research  
Integrated transport and mobility
- Develop marine roadmap and UK capability study
- Research and consultation for refreshed strategy through Knowledge Transfer Networks and others

#### Target result

- Identify innovation in rail transport and ensure full engagement with the rail industry. New players with novel solutions identified and new collaborations formed
- Some key enabling technologies to accelerate the UK supply chain capabilities are identified
- Further development of UK supply chain capabilities brings new technologies to market
- The role of hydrogen and fuel cell systems in end-to-end systems is demonstrated and the economic viability and environmental sustainability of hydrogen and fuel cell systems is validated – in collaboration with our energy team
- Consensus view on the business opportunities and challenges for integration of transport  
Publish Q1 2012
- Full engagement with industry  
Publish during 2012
- Strategy published by the end of the financial year

## Health – prevention, management, diagnosis and tailored therapies

### Opportunity

There is no doubt that the UK is a powerhouse in the medicines and health technologies industry. The UK industry discovered and/or developed more than 20% of the world's 100 top-selling medicines, more than any country apart from the US, and more than the rest of Europe combined. The pharmaceuticals and biotechnology industries contributed 4% of total UK value added in 2008 at £30.1bn, while the healthcare equipment and services sector contributed 0.5% at £3.7bn.

### Challenge

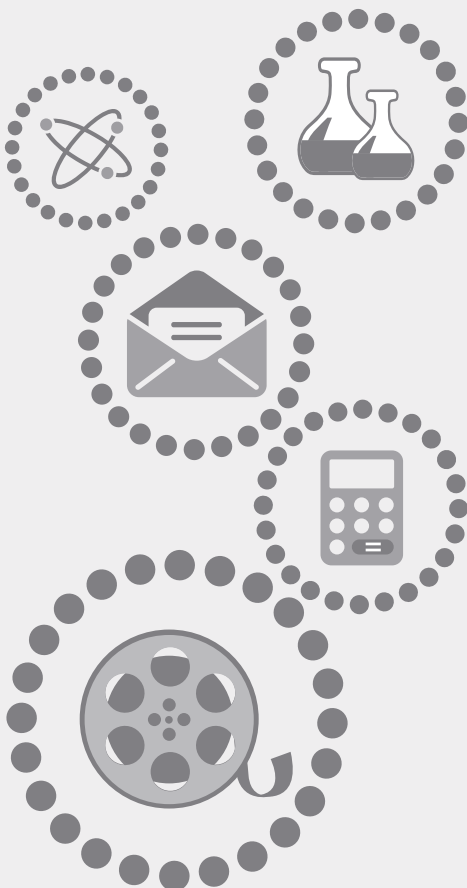
Current healthcare models are facing greater challenges, both physically and financially, in providing for a growing, ageing population with an increasing burden of disease. For companies to meet these challenges, they must recognise the drivers behind the healthcare challenges and look at models of:

- disease prevention and proactive management of chronic disease
- earlier and better detection and diagnosis of disease leading to marked improvements in patient outcomes
- highly effective treatments that are tailored to patients' needs and either modify the underlying disease or offer potential cures.

### Action

Over the next four years we will deliver programmes in:

- assisted living – helping businesses to deliver technological and service innovation to support independent living for an ageing population
- detection and identification of infectious agents – enabling companies to address the market need to reduce mortality, morbidity and economic burden of infectious diseases
- stratified medicines – supporting companies to create cost-effective solutions to delivering the right therapy to the right patient at the right time
- regenerative medicine – helping UK businesses to take advantage of the next generation of treatments to deliver long-term relief or cures for diseases.



In 2011–12	
Action	Target result
<ul style="list-style-type: none"> <li>● Establish a technology and innovation centre in cell therapy</li> </ul>	<ul style="list-style-type: none"> <li>● A national focus for joint work between business and the research base and a critical mass of activity to benefit the entire cell therapy sector</li> </ul>
<p><b>Assisted Living Innovation Platform</b></p> <ul style="list-style-type: none"> <li>● EU competition April 2011 Ambient Assisted Living – up to £1m</li> </ul>	<ul style="list-style-type: none"> <li>● UK elements of cross-EU projects funded, enabling outreach for the ALIP programme and ALIP projects</li> </ul>
<ul style="list-style-type: none"> <li>● DALLAS £23m programme launched April 2011 SBRI competition June 2011 Delivering Assisted Living Lifestyles At Scale (DALLAS) – up to £1m</li> </ul>	<ul style="list-style-type: none"> <li>● Preparatory work at the start of the demonstrator programme – five communities are established that enable the assisted living sector to grow and position UK businesses to take advantage of global demand for assisted living goods and services</li> </ul>
<ul style="list-style-type: none"> <li>● Standards and regulation in assisted living</li> </ul>	<ul style="list-style-type: none"> <li>● With the HealthTech and Medicines Knowledge Transfer Network, standards for interoperability are developed and disseminated</li> </ul>
<ul style="list-style-type: none"> <li>● <b>Independence matters programme</b> – joint collaboration with the Design Council SBRI competition June 2011 Home and Away phase 2 – up to £400k</li> </ul>	<ul style="list-style-type: none"> <li>● Phase 2 contracts enable designers and businesses to work with older adults and third-sector organisations to develop and test new service solutions focused on nutrition and mobility in older adults that can then be taken to market</li> </ul>
<ul style="list-style-type: none"> <li>● Business challenge – Keeping connected September 2011 Competition delivered in collaboration with the Design Council – up to £495k</li> </ul>	<ul style="list-style-type: none"> <li>● Innovative services are developed that create, improve and sustain connectedness for older adults to friends, family, the community and younger generations</li> </ul>
<p><b>DIIA Innovation Platform</b></p> <ul style="list-style-type: none"> <li>● Collaborative R&amp;D competition August 2011 Sepsis 1: Multi-pathogen detection and/or simple discrimination – up to £5m in partnership with the Department of Health Including pilot of the Design Option (see details under Development section)</li> </ul>	<ul style="list-style-type: none"> <li>● New point-of-care diagnostic tools to assist clinicians and health workers in the management of sepsis</li> </ul>
<ul style="list-style-type: none"> <li>● Collaborative R&amp;D competition September 2011 Sepsis II: Advancing biomarker use in sepsis management – up to £2.5m, in partnership with the Department of Health</li> </ul>	<ul style="list-style-type: none"> <li>● Biomarkers are more effectively used in the management of sepsis</li> </ul>
<ul style="list-style-type: none"> <li>● SBRI competition September 2011 Assessing the impact of near-patient testing – up to £1m, in partnership with the Department of Health</li> </ul>	<ul style="list-style-type: none"> <li>● New and improved tools, products or capabilities are developed in the field of health economics to assist companies in the design and evaluation of diagnostic clinical trials</li> </ul>
<p><b>Stratified Medicine Innovation Platform</b></p> <ul style="list-style-type: none"> <li>● Develop a technology roadmap</li> </ul>	<ul style="list-style-type: none"> <li>● Technology roadmap is published October 2011</li> </ul>
<ul style="list-style-type: none"> <li>● In development: Collaborative R&amp;D competition March 2012</li> </ul>	<ul style="list-style-type: none"> <li>● To deliver the first stages of the roadmap</li> </ul>
<ul style="list-style-type: none"> <li>● Work with research councils to develop a regenerative medicine roadmap</li> </ul>	<ul style="list-style-type: none"> <li>● Publish the roadmap and identified new areas of work for regenerative medicine</li> </ul>

# Competencies

Digital services – everyone, everywhere, all the time

## Opportunity

Digital is about services, and how the current explosion of communications and computing power is transforming them. Digital is not just about the IT sector, and it is not just about technology: businesses throughout the economy are watching their customers' expectations changing. The most innovative are embracing the potential of this technology-driven revolution.

## Challenge

The challenges include the creation and realisation of value in digital assets, the power of information to improve efficiency and service delivery, the justification for investment in appropriate infrastructure, and the management of human concerns and risks surrounding use of the internet and mobile communications.

## Action

We encourage the necessary collaboration in innovation projects and broker trust and new working practices between players in the ICT domain and their customers and co-dependants in other industry sectors.

The creative industries have been quick to embrace the digital economy in the management of their content. Therefore we will often pilot innovation activities in content-dependent creative industry applications, then aim to migrate this learning across to other sectors.

## In 2011–12

### Action

- Launchpad competition May 2011  
Pilot Tech City Launchpad competition – up to £2m

### Target result

- To multiply the already vibrant innovation activity around the Tech City cluster in East London and bring more investors into the area

- £5m Internet of Things programme launched June 2011  
Preparatory studies competition – up to £500k  
Setting up a special interest group on **\_connect**

- Preparatory studies inform the scope of the £4m collaborative R&D demonstrator competition in 2012
- Members of the Internet of Things special interest group on **\_connect** help shape the programme

- Ramp-up of IC tomorrow platform – up to £2.5m covering inclusion of LinkedGov and Digital Licensing Platform

- Use of IC tomorrow builds to critical mass (50 content providers engaged, 100 application providers, 10,000 content items on the platform and 20 trials ongoing), offering free services to innovators to trial their prototype services and apps

- In development: Feasibility studies competition January 2012 – Up to £2m

- Scope under development

- In development: Collaborative R&D competition Early 2012 – Up to £4m

- Scope under development

## High value manufacturing – maintaining UK competitiveness

### Opportunity

Global manufacturing is a key provider of wealth and employment, accounting for US\$10tn of value added world-wide. The UK is the seventh largest manufacturer in the world and has an industry worth £140bn – representing 11% of GDP and around 50% of exports – employing three million people.

With the lowering of economic barriers to trade, the reduction in transport costs and the enabling effect of communications technology, manufacturing is highly competitive. Activity gravitates to the countries of lowest overall cost, particularly where technical barriers are low (and intellectual property can be safeguarded).

### Challenge

Manufacturing in high-cost economies such as the UK has had to change radically to remain globally competitive. This has resulted in a shift towards high-value, knowledge-intensive goods; a new emphasis on lifetime service around a manufactured product; a change in the business model, in terms of increasing specialisation and outsourcing of non-core activities; and a change in ownership, with the creation of large, global players, some of which are UK-owned.

### In 2011–12

#### Action

- Work with seven partners to enable launch of high value manufacturing technology and innovation centre
- Consultation with senior manufacturing industry players on the Future Manufacturing Landscape Study being conducted by the Institute of Manufacturing
- Refresh the original 2008-2011 high value manufacturing strategy
- Collaborative R&D and feasibility competition (open until 3 November 2011)  
Producing High-Value Chemicals Through Industrial Biotechnology – up to £2.5m  
In partnership with Innovation Norway
- Collaborative R&D competition June 2011  
ICT for manufacturing and construction – up to £7m
- Establish first manufacturing special interest group on additive layer manufacturing through **\_connect**
- In development: collaborative R&D competition  
Up to £3m March 2012

#### Target result

- First technology and innovation centre in high value manufacturing opens October 2011
- Support of leading UK manufacturing companies, including SMEs, for the priority areas which will drive the centre's future plans and investments
- Publish strategy for 2012-2015 in Q1 2012
- Greater use of industrial biotechnology in chemicals and chemistry-using businesses, in particular focusing on the replacement of petroleum-based feedstocks
- Product and process innovation is accelerated, interoperability across supply chains is encouraged and users are engaged in design and operation processes
- The group's members help to inform the scope for a competition on additive manufacturing
- Scope under development

# Enabling technologies

## Advanced materials – exploiting multidisciplinary technologies and applications

### Opportunity

Businesses in the UK that produce, process, fabricate and recycle materials have an annual turnover of around £170bn. They contribute about 15% of UK GDP, with a GVA of around £60bn, and form an important element in the supply chain of many high value manufacturing businesses. This is strong position from which to grow and offers great potential for UK businesses.

### Challenge

Advanced materials represent a large and underpinning multidisciplinary technology platform, with many crossovers into other technical areas and with the potential to address challenges across a broad landscape of applications. Challenges include fragmentation, availability of resources, globalisation, sustainability, and prioritisation of technology areas.

### Action

To 2011 we have focused our work in materials in four areas:

- structural materials
- functional materials
- multi-functional materials
- biomaterials.

In addition we looked at cross-cutting areas, including nanomaterials, modelling, design, metrology and standards, and manufacturing.

We are now re-examining our advanced materials strategy and will be consulting the sector, including industry experts, researchers, public and private organisations and members of our Knowledge Transfer Network through **\_connect.**

### In 2011–12

#### Action

- Collaborative R&D competition June 2011  
Materials for energy – up to £3m

- Collaborative R&D competition November 2011  
Nanoscale technology-enabled healthcare – up to £3m (with up to £6m from the Engineering and Physical Sciences Research Council)

- Consult the sector and use the Knowledge Transfer Networks to redevelop the strategy

#### Target result

- Innovative materials technologies are applied and demonstrated in energy generation, transmission and distribution, and storage

- Solutions in the healthcare sector, specifically in the areas of diagnostics and targeted therapeutics are developed

- A refreshed strategy as part of an overall technology strategy published by the end of the financial year

## Biosciences – profiting from the power of biological systems

### Opportunity

The UK, building on its strong base in the biosciences, is well-positioned to exploit the business opportunities that arise from the global challenges of a secure energy and food supply as well as affordable healthcare. In particular, we see opportunities for UK businesses in exploiting advanced biofuels, new crop varieties, bio-based materials, novel medicines and sustainable alternatives to petroleum-derived products.

### Challenge

In the age of genomics we are drowning in a deluge of data but it is still a mystery how genetic variation relates to observed differences at the whole-organism level and how this is influenced by our environment. High throughput genomic sequencing, bioinformatics and imaging techniques will help tackle this.

Other challenges include:

- the need for cross disciplinary working to bring forward biosciences-inspired technologies
- a requirement for access to very specialised equipment and expertise to demonstrate proof of concept
- the need for a supportive, structured package of investment
- the fostering of knowledge-sharing and collaboration between our high-impact academic base and UK business.

### Action

To date we have focused on:

- supporting greater use of genomic-based technologies and knowledge-sharing by UK companies
- development of technologies to produce second and third-generation biofuels through novel and/or improved processes
- development of next-generation multi-product biorefinery technologies
- encouraging the chemicals and chemistry-using businesses to exploit the opportunities for bio-based processes
- supporting the development of technologies that underpin advances in the agriculture and food sectors.

These remain the priorities for this year and we will be renewing our strategy by the end of the financial year.



### In 2011–12

Action	Target result
<ul style="list-style-type: none"> <li>● Collaborative R&amp;D and feasibility competition May 2011 Nutrition for Life – up to £6.75m In partnership with EPSRC, MRC, BBSRC, Defra and Scottish Government</li> </ul>	<ul style="list-style-type: none"> <li>● Development of bio-based technologies, processes and methods related to the food and drink sector that also support the creation of healthy and safe food.</li> </ul>
<ul style="list-style-type: none"> <li>● Consult the sector and use the knowledge transfer networks to redevelop the strategy</li> </ul>	<ul style="list-style-type: none"> <li>● A refreshed strategy published as part of an overall technology strategy by the end of the financial year</li> </ul>

## Electronics, Photonics and Electrical Systems (EPES) – a means to tackle the big challenges

### Opportunity

Our ability to harness the potential of the electron and the photon continues to bring dramatic changes to the way that society conducts its everyday life from computers and smartphones through to renewable energy generation. We encourage players to cooperate in strategic challenge-led areas to the best advantage of the UK economy.

Electronics technologies are ubiquitous, and society is becoming increasingly dependent on them to function. The UK is well-positioned to capitalise on these technologies. As of 2008, EPES manufacturing employed more than 330,000 people in 14,000 UK businesses. This is a growth industry.

### Challenge

Some of the challenges in the EPES sector include:

- the prohibitive cost of product development and manufacturing (particularly for new early-stage technologies)
- a fragmented supply chain
- a general lack of vertically integrated companies that can realise products with an internal supply
- a fiercely competitive global market.

### Action

In our 2008-2011 EPES strategy we focused on:

- control systems and power engineering
- plastic and printed electronics
- data and image acquisition
- communications
- systems design and integration.

These remain the priorities for this year. The priority areas for 2012 and beyond are currently being revisited, and will result in a new strategy in 2012.

### In 2011–12

Action	Target result
<ul style="list-style-type: none"> <li>● ERANET+ EU competition – October 2011 Organic and Large Area Electronics (OLAE) – up to £4m</li> </ul>	<ul style="list-style-type: none"> <li>● Technology and business relationships within the OLAE community, removing barriers to industrialisation</li> </ul>
<ul style="list-style-type: none"> <li>● Consult the sector and use the knowledge transfer networks to redevelop the strategy</li> </ul>	<ul style="list-style-type: none"> <li>● A refreshed strategy published as part of an overall technology strategy by the end of the financial year</li> </ul>

## ICT – the backbone of the digital economy

### Opportunity

ICT drives productivity across all sectors and enables business transformation. IT-intensive sectors contribute more than half of the UK's total GVA. Estimates suggest that the continued adoption and exploitation of existing ICT has the potential to contribute an extra £50bn over the next five to seven years, and the development and adoption of new ICT will only add to this. Large global markets represent significant opportunities for the UK, which has many strengths in high-value ICT activities such as systems engineering, human factors and artificial intelligence.

### Challenge

The challenges for the UK ICT sector fall into a number of areas:

- data driven systems: supply chains are currently insufficient to provide commercial end-to-end solutions to meet data gathering requirements
- intelligent systems: despite high UK capacity, there is a gap between strategic adopters (such as defence and finance) and other sectors (such as healthcare and manufacturing)
- user-centric systems: bringing them to sectors such as e-government and e-health
- ICT systems engineering: in parallel computing and robotics the communities are fragmented.

There are also opportunities to address concerns in large infrastructures around complexity, sustainability and cyber security.

### Action

We are working to our current ICT strategy and will then revise it after extensive consultation with industry, researchers and key players in the sector.

### In 2011–12

#### Action

- Knowledge Transfer Partnerships pilot competition June 2011  
Multicore and parallel computing – up to £1m

#### Target result

- By establishing a cohort of 15 partnerships, adoption of parallel computing in businesses across a range of sectors is stimulated and improved as well as its profile being raised and greater, more sustainable knowledge exchange achieved

- Consult the sector and use the Knowledge Transfer Networks to redevelop the strategy

- A refreshed strategy published as part of an overall technology strategy by the end of the financial year

## Development – spotting technology-related opportunities as they emerge

### Opportunity

New technologies offer the potential to create markets and provide a leading edge for the UK economy. We aim to identify and evaluate significant new technology-related business opportunities for the UK and, where appropriate, turn them into robustly argued and coherent programmes.

### Challenge

We have identified several areas which challenge the development of innovation and are looking for ways to make sure businesses can overcome them:

- new innovation opportunities do not come knocking on our door – we have to actively seek them out. And identifying, within any given area, how the UK can best capture part of the value chain takes considerable analysis and engagement
- design: it has been recognised that building design into a product or service development from the start may give the project a much better chance of becoming successful. But it is not always easy for the technology/research and design communities to work with each other
- emerging technologies: how do we spot which are the right ones to invest in (according to our four criteria)?

### Action

Over the next four years we will be working on these areas:

- emerging technologies and industries
- creative industries
- new programme areas.

We have initiated some projects to get the design and research/technologist communities working more closely together, such as the joint collaboration with the Design Council on the assisted living programme (see healthcare) and piloting the

Design Option as a component tool in a collaborative R&D competition where potential applicants can gain free access to design advice at the start of shaping their project.

We will also be evaluating opportunities presented by global challenges by working with the Department for International Development, and by working in the area of personal safety whether it be in the physical world (violent crime against the person) or virtual world (such as ID theft or online bullying), and whether the risk is perceived or real.

### In 2011–12

#### Action

- Pilot the Design Option within a competition to provide free access to designers for applicants
- Long list of over 140 emerging technologies whittled down to four most promising candidates. In development: Collaborative R&D competition January 2012 – up to £4.7m
- Research the potential for an innovation platform in technology-enabled learning

#### Target result

- Applicants to the Sepsis I competition build design into their project plans from the start and deliver more promising projects because of it
- Coherent programmes of work with key partners in those areas with a compelling case for action now, and clear added-value from Technology Strategy Board involvement, to accelerate innovation in the technology areas
- Work continues in 2012

# Continuously improving our capability

As an organisation we undertake to deliver the programmes outlined in this document

We will support and develop our talent, and ensure that our organisation provides a positive and stimulating environment, where our people can thrive and work effectively together.

We will continue to develop our business process to be fast, flexible, and focused on the needs of the businesses that we support, and our benchmarks and impact measures to ensure that we remain highly effective and deliver value for money.

**Target:** To review and enhance our processes to ensure we add value to all of the businesses that engage with us.

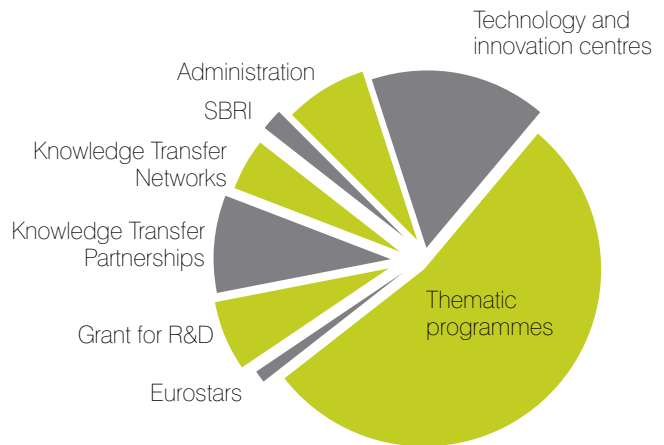
**Target:** To transfer activities formerly supported by the regional development agencies in a professional manner. The Grant for R&D programme (run in a different form by the regional development agencies) was launched in April 2011.

**Target:** To fully integrate the KTP programme into our organisation.

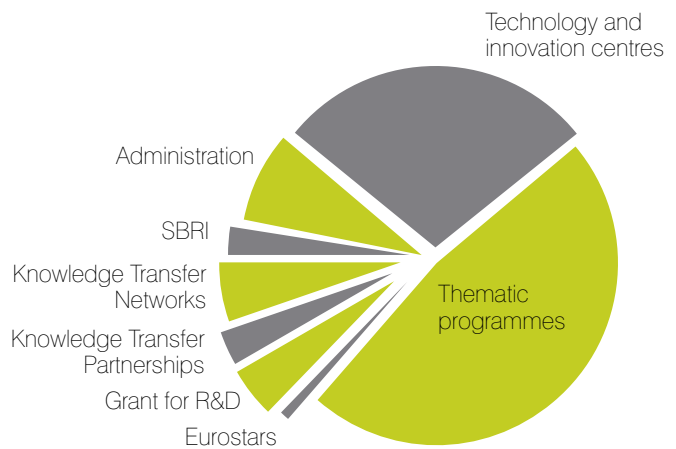
**Target:** To publish a review of the impact of the collaborative R&D and initiate a programme of evaluation and impact analysis across all of our support programmes.

## Financial summary

### 2011-12: Breakdown of estimated expenditure £317m



### 2014-15: Breakdown of estimated expenditure £332m



N.B. Our programmes attract significant levels of funding from other organisations, both public and private sector, which is not included in the above.

# Technology Strategy Board

Driving Innovation

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