

Advanced Manufacturing

[http://interactive.bis.gov.uk/
advancedmanufacturing](http://interactive.bis.gov.uk/advancedmanufacturing)

We will work closely with the Devolved Administrations in Northern Ireland, Scotland and Wales, recognising their particular and varying responsibilities. While some of the policies in this paper are specific to England, the challenges are common across the four countries of the United Kingdom. Each will consider the most appropriate arrangements in those areas for which they have devolved responsibility, to address the issues in ways that meet their own circumstances and needs.





Peter Mandelson
Secretary of State for
Business, Innovation and Skills

“ At the heart of Britain’s knowledge economy is our manufacturing base. High-value, highly skilled and internationally successful businesses that have worked hard to secure a lead in hi-tech global supply chains.

This practical package of measures will help equip British manufacturers, of all sizes and sectors, to take advantage of the advanced technologies and new market opportunities now shaping our industrial future.

It’s about giving them the support they need to create jobs in Britain and export the best of British manufacturing design, technology, skills and innovation around the world. ”

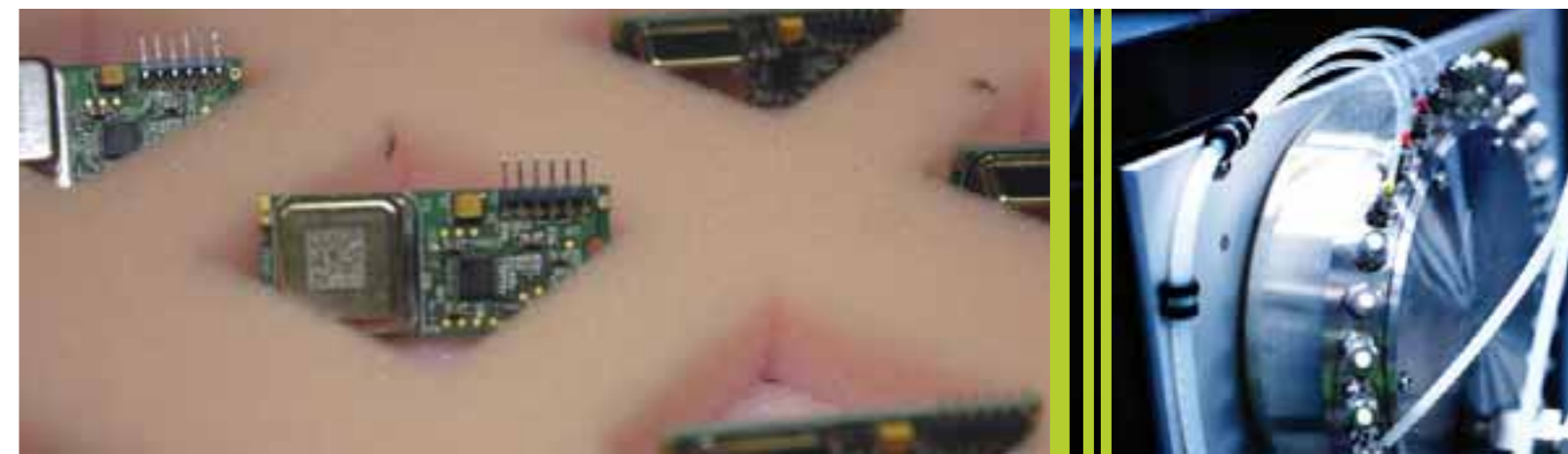
What is Advanced Manufacturing?

Advanced Manufacturing describes businesses which use a high level of design or scientific skills to produce technologically complex products and processes. Because of the specialised requirements involved, these are usually goods and associated services of high value.

Advanced Manufacturing is often based on new industrial platform technologies that have multiple commercial applications. For example, the composite materials that are being developed to replace various metals in many goods are used in shipbuilding, aerospace, car manufacturing, and construction.

Advanced Manufacturing is possible across the huge range of activities that encompass modern industry, from large aerospace companies to small firms spun off from university research. This is an area where the UK’s leading industrial companies excel – thanks to their competitive advantages in design, technology, skills, innovation and creativity. We want to enable more of our companies to exploit opportunities to become advanced manufacturers and to ensure that the benefits accumulate throughout the supply chain.

Our leading industrial companies exemplify Advanced Manufacturing through their use of state of the art equipment, highly skilled people, design, new technologies, and research and development. Ultimately the success of manufacturing in producing world-leading products and processes



rests with industry, but depends heavily on the right conditions for business, including the science base and a skilled workforce. For this reason, ensuring that the Government is providing the right frameworks for the further development of Advanced Manufacturing in the UK is both necessary and important.

Our work on Advanced Manufacturing builds on the Government's 2008 Manufacturing Strategy and the *New Industry, New Jobs* strategy of April 2009, in which the Government set out its broad framework for supporting the development of new industries and new jobs in Britain. This booklet sets out what we are doing to take action across a range of areas to complement industry's efforts to unlock the huge potential in Advanced Manufacturing, including a significant package of new measures. We will continue to work closely with all parts of industry, including business associations and trade unions, in delivering this work and to identify and assess further opportunities.

Opportunities in Advanced Manufacturing for Britain

Despite the recent slowdown in global growth and world trade, many still expect the world economy to double in size over the next decade – driven by the growth in prosperity of emerging markets like China and India¹. The market for high value goods and services associated with Advanced Manufacturing, especially those produced to high environmental standards, is likely to increase significantly. New and improved technologies will continue to reshape manufacturing by creating the capability to adopt more efficient processes and develop new and better products to cater for new and changing market demands, such as low carbon².

The UK is well placed to take advantage of this growing market. The UK is the world's sixth largest manufacturer measured by output, and has a well developed infrastructure of manufacturing companies and supply chains. The UK is a leading exporter of high-tech goods, with 25% of UK goods exports defined as high-tech, compared to 22% in the USA, 15% in France, and 11% in Germany.

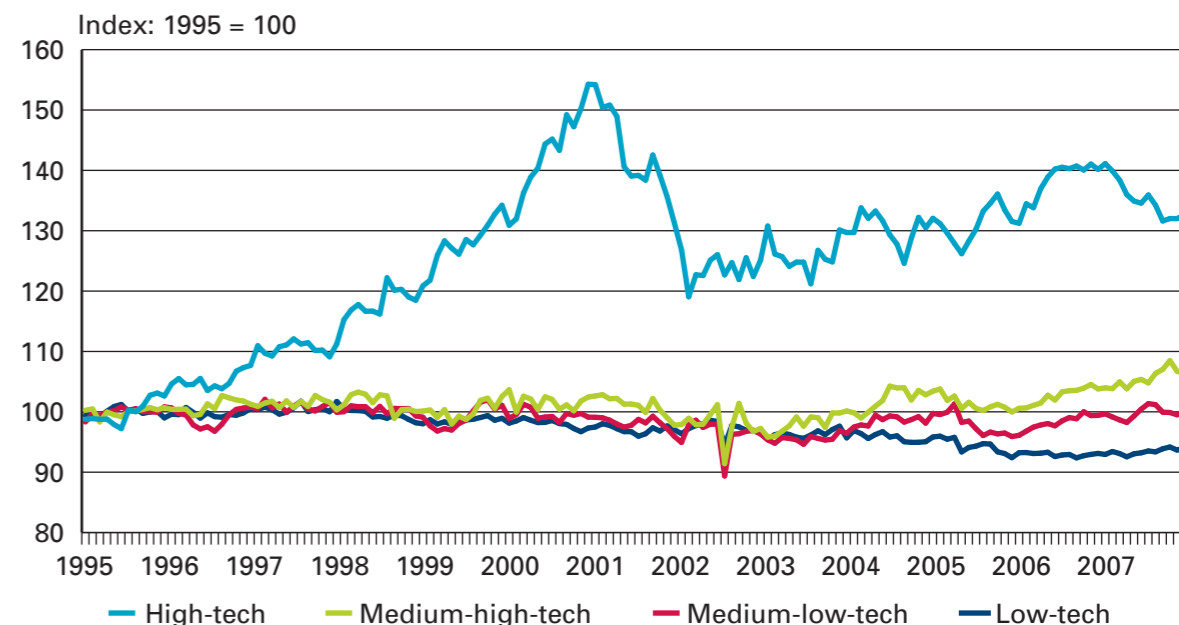
1. HMG (2009) Building Britain's Future: New Industry, New Jobs
 2. Ernst & Young (2008) Comparative Advantage and New Business

Much of our manufacturing has transformed beyond its historical origins in labour-intensive production lines and heavy engineering, and is now focused on specialised and diverse activities, particularly in high technology areas. Many UK-based firms have used information and communications technology, new materials such as advanced composites, and process revolutions such as nanotechnology and biotechnology to transform the way they work. These innovations have driven growth in Advanced Manufacturing sectors far faster than in other manufacturing (Figure 1).

Testament to this is the fact that the manufacturing sector is a major investor in innovation and productivity and contributes 75% of all UK business expenditure on research and development in the British economy. The UK outperforms every other country in Europe in attracting manufacturing foreign direct investment, and is second overall only to the USA globally. Investments in high-tech manufacturing projects increased by 18% in 2008³.

For this reason, the jobs created in Advanced Manufacturing activities are in highly skilled areas such as specialist

Figure 1: Manufacturing output in the UK



Source: ONS and Treasury calculations based on OECD classification of manufacturing industries according to technology intensity

3. UK Trade and Investment (2009) UK Inward Investment 2008–2009



production techniques, R&D, product design, and professional support services. For example the recent announcement by Nissan to invest more than £200m over the next five years in a new rechargeable lithium-ion battery plant in Sunderland – Nissan's European Centre for Excellence for Battery Manufacturing – creates up to 350 direct jobs and creates and safeguards hundreds more in the associated supply chain. High-tech manufacturing generates 27% higher wages than average manufacturing (Figure 2).

The Government's approach to Advanced Manufacturing

Much has already been done to identify opportunities for manufacturers that are to be gained from developing innovative processes and products⁴. For example, the 2008 Manufacturing Strategy highlighted the importance of technology exploitation, and strengthened support in this area. Innovation and Growth Team reports

developed in partnership with industry, identified opportunities in sectors such as automotive, aerospace, and electronics. The recent Low Carbon Industrial Strategy set out the vast potential economic benefits for the UK of the low carbon future, including the capability to develop less carbon-intensive products and the opening up of new markets.

Of the range of new industrial technologies, with multiple commercial applications across sectors, a number of them offer particularly high growth potential. This is clearly not an exhaustive list and further analysis is needed to keep monitoring emerging growth trends and the state of UK capabilities in these and other areas.

But for the moment, we have identified the following technologies as having significant growth opportunities.

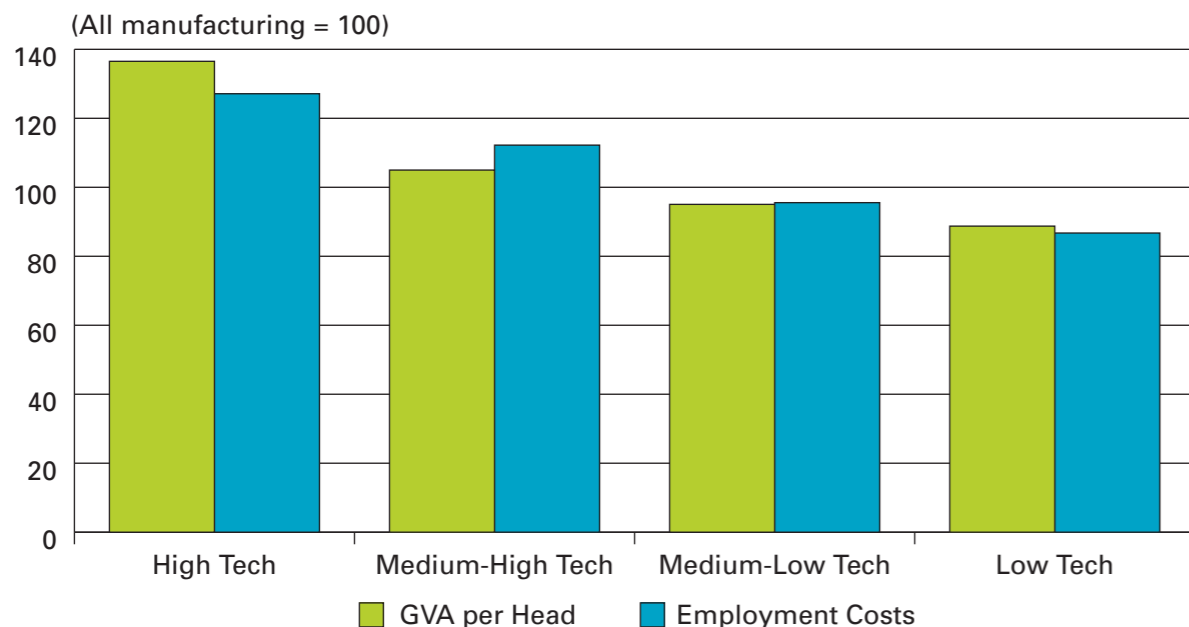
Cambridge Display Technology – Plastic Electronics

The Cambridge University spin-out company, Cambridge Display Technology, has been at the forefront of developments on polymer light emitting diode (P-OLED) technology over the past twenty years. P-OLED displays promise significant advantages over their liquid crystal equivalents – very thin form factor, low power consumption, high contrast, very fast response and wide viewing angle.

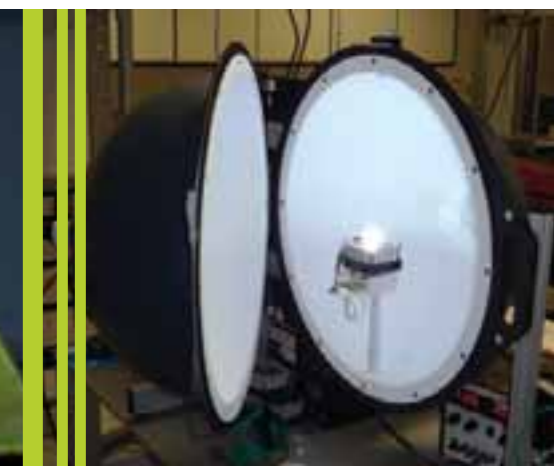
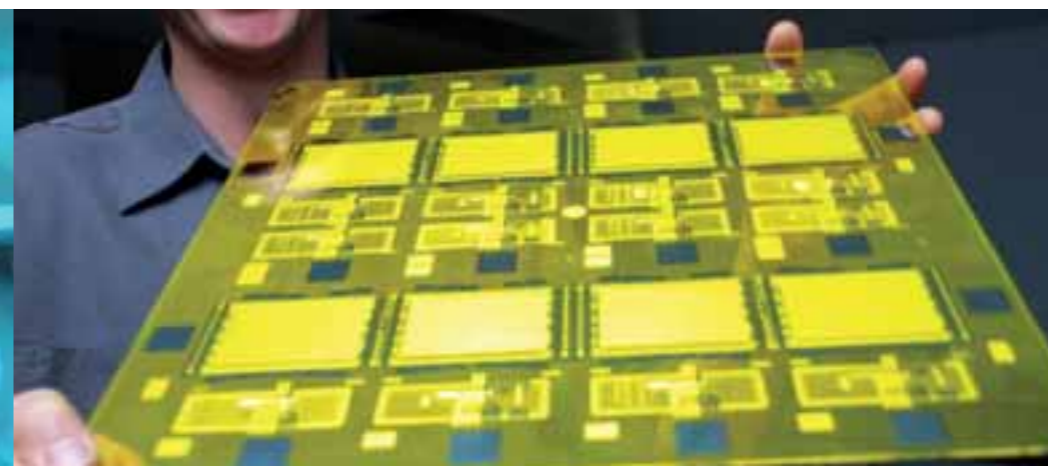
More recently the company has been working on a Government supported project with Durham University and Thorn Lighting to develop the materials and manufacturing processes required to produce large area P-OLED lighting panels.

www.cdlttd.co.uk

Figure 2: UK Manufacturing Gross Value Added (GVA) per Head and Employment Costs in 2007



4. This includes: BERR (2008) Economics Paper No. 2: Five Dynamics of Change in Global Manufacturing; PriceWaterhouseCoopers (2009) The Future of UK Manufacturing; HMT (2007) The Race to the Top: A Review of Government's Science and Innovation Policies.



Axon Automotive: low carbon vehicles

Axon Automotive has developed from the Government's Foresight Vehicle Programme and through a series of projects at Cranfield University has patented globally carbon fibre chassis technology and a very efficient 500cc petrol engine which provides 100mpg fuel economy and low CO₂ emissions.

Recent support from the Technology Strategy Board has helped Axon to stay at the forefront of low carbon vehicle design by advancing from blue skies research to vehicle production and procurement. Axon launched its prototype city car at the Eden Green Car show, Cornwall 2008 and the first vehicle will be on the market in 2011.

www.axonautomotive.com

Growth opportunities from advanced industrial platform technologies

Plastic Electronics (also known as printable electronics) is an emerging field with medium to long-term potential. It opens up the prospect of electronic circuits manufactured using cheap printing processes on flexible

surfaces. This will lead to the creation of a whole new range of products such as rollable electronic displays, large area efficient lighting, and low cost solar cells. The global market is under £1bn now but forecast to grow to £15bn by 2015 and £125bn by 2025.

Industrial biotechnology is the application of biotechnology for the manufacturing, processing and production of chemicals, materials and energy. It is used in the chemicals and pharmaceuticals sectors as well as downstream sectors that use chemicals in their products or processes (eg, construction and automotive, cosmetics, household and industrial detergents, paints, adhesives, inks and papermaking, biodiesel, pharmaceutical products, including vaccines). The UK market has significant potential and is estimated to grow between £4–12bn and the global market between £150–360bn by 2025 in the chemical sector alone.

Composites, in particular carbon fibre based composite materials, have excellent strength to weight properties that enable lightweight, durable, low maintenance, strong structures. They are a critical component in the production of a new generation of aircraft, high performance boats, cars and larger wind turbine blades. The global composite market was worth £53bn in 2008 and predicted to grow to £74bn by 2013 even taking account of the recession. A conservative estimate

of the future value of the UK composite market is at least £20bn – the UK market for composite wind turbine blades alone will be worth in excess of £5bn.

Silicon electronics: is the design, development and manufacture of extremely small electronic devices on wafers of single-crystal silicon that consume very little electric power. The UK microelectronics sector creates high value jobs and significant wealth. The global market for semiconductors is estimated at \$279bn [£170bn] with 1% growth this year and the UK is the third biggest player in Europe (after Germany and France) creating high value jobs and significant wealth.

Whilst there are a wide range of further opportunities with the potential to be successfully exploited by UK based companies, many will not require dedicated Government intervention. However, in some instances, there are barriers that can be effectively addressed to enable UK manufacturers to realise their full potential.

- **Access to information and investment:** Knowledge of latest manufacturing practices and processes is often difficult to access, particularly for SMEs, as there may be weak dissemination incentives for industrial best practice and the value of information can only be appraised by companies as it demonstrates its worth, after they have invested in it. There is also a need to ensure that Advanced Manufacturing firms can

access appropriate forms of finance, and there are demonstrated barriers particularly for start up companies in their efforts to access the necessary venture capital.

- **Skills:** Advanced Manufacturing requires a sophisticated skills base. Firms may be dissuaded from investing in skills by the high costs of training and worker mobility, whilst individuals may be dissuaded by long learning periods and the potential high degree of specialisation of their resulting skills.
- **Take up of new technologies:** Many firms may find it difficult to justify to their investors exploring the use of new technologies because of the highly uncertain commercial returns from new research and development activity; the costs of demonstrating the successful application of new techniques, and the potential to appropriate any resulting benefits when spillovers might occur.
- **Specific sectoral challenges:** While many challenges and opportunities are common across sectors, their scale and impact can vary due to a combination of structural features and circumstances. As a result, policies often need to take account of such variations, for example, through more focused targeting, so as to maximise impact and deliver value for money.

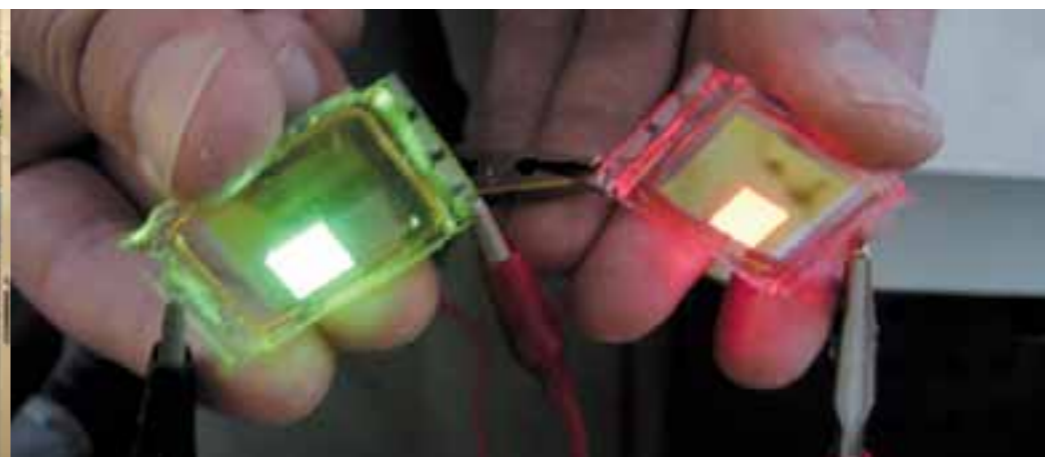
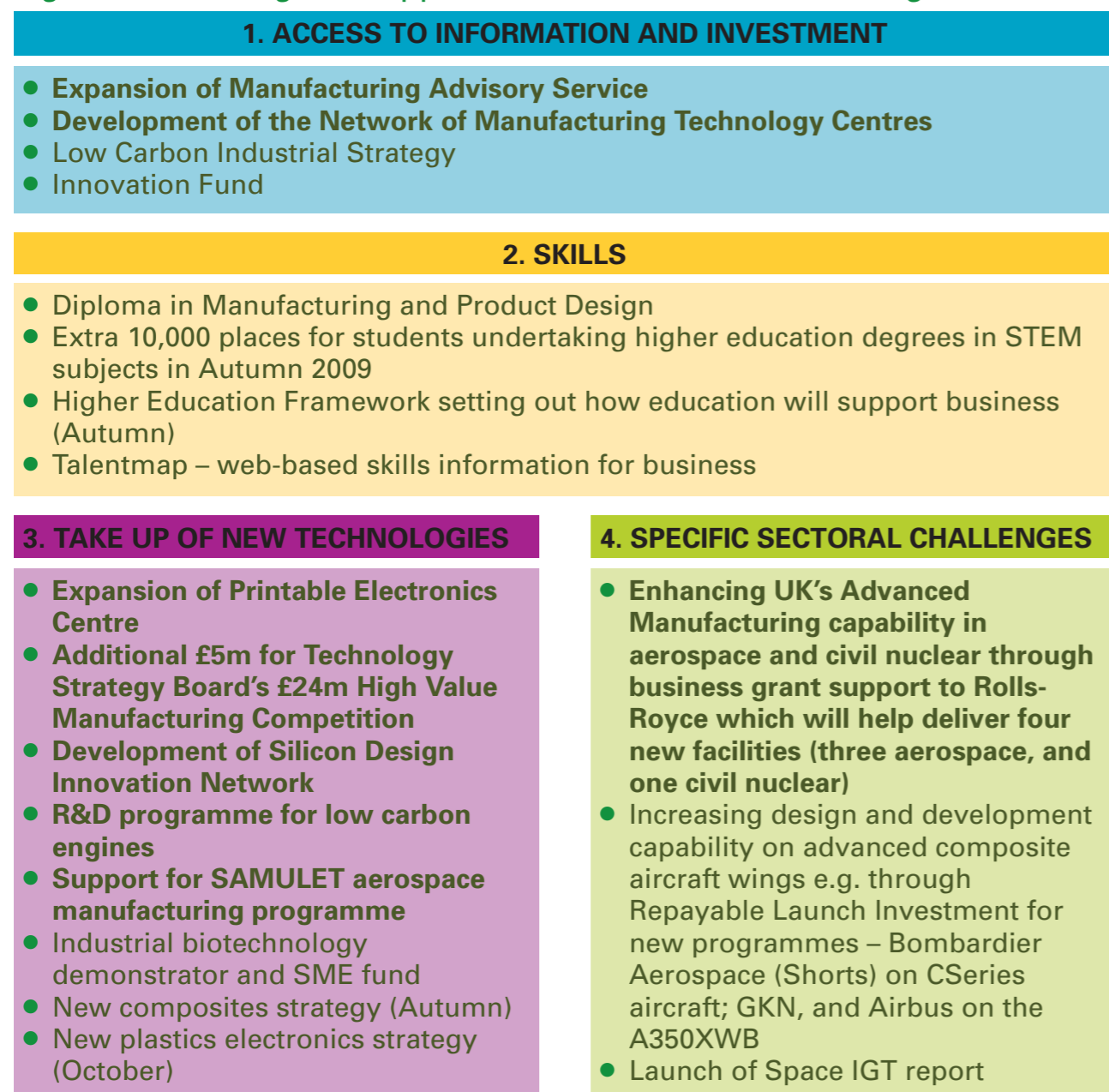


Figure 3: A Package of Support for Advanced Manufacturing



Text in **bold** indicates new proposals announced in this document

A package of support

Reflecting on the ability of UK advanced manufacturers to exploit significant growth opportunities, the evidence on barriers as listed above and the ability of Government to overcome these at a reasonable cost, Government is taking the following actions, as summarised in Figure 3.

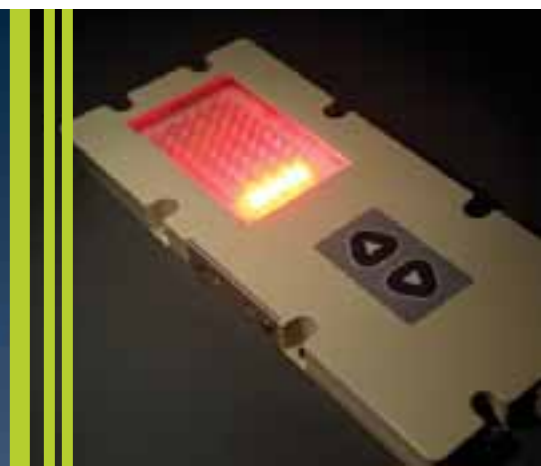
1. Access to information and investment

The potential of UK-based Advanced Manufacturing companies is sometimes best complemented by Government through policies and schemes open to the broad range of firms and sectors. This includes efforts to facilitate and expand access to high quality advice on best business practice.

Central to the Government's strategy in this area is the Manufacturing Advisory Service, which provides help and advice to small and medium sized companies across the whole range of the modern manufacturing sector. Since its launch in 2002, over 28,000 reviews and 10,000 detailed projects have been undertaken by the MAS. This has resulted in over £700m benefit to the companies through improved efficiency and additional business. It is estimated for each £6k invested in MAS, of which £3k is public money, £35k of net benefit is received by business.

Recent measures that will benefit manufacturers include:

- To address the problems faced by technology-based companies in accessing equity finance, in June 2009 the Government announced the creation of the **UK Innovation Investment Fund**. Based on a cornerstone investment of £150m from the Government, this investment will create a Fund of Funds that will leverage additional funding from the private sector, with the aim of building this into a £1bn fund over 10 years. The UKIIF will invest in underlying technology funds that will invest in companies in sectors such as the life sciences, ICT, low carbon and high value manufacturing.
- The **Low Carbon Industrial Strategy**, also launched in July, has announced a £4m expansion of the Manufacturing Advisory Service to provide specialist advice to manufacturers on competing for low carbon opportunities, including support for suppliers for the civil nuclear industry.
- A Government and industry **international marketing strategy for UK advanced engineering** was launched in March 2009. The aim of the strategy, which was developed by UK Trade and Investment in consultation with UK businesses and organisations, is to position the UK as a destination of choice for advanced engineering, and ultimately help increase international sales for businesses and attract more, high added-value inward investment.



It has three programmes which aim to promote key marketing messages about UK advanced engineering internationally; improve information flow to SMEs and develop their marketing capability; and build UK business confidence in, and commitment to, this message.

New Advanced Manufacturing measures we are introducing:

- **Expansion of the Manufacturing Advisory Service (MAS).** Since 2002, MAS has been providing high quality advice to manufacturers. In order to expand the provision of advice to a wider range of businesses and promote adoption of new technologies, we will provide an additional £4m of funding across 2009–2011. This will allow MAS advisers to deliver projects to an additional 650–700 companies which should result in a benefit to manufacturers of £30m–£35m in reduced costs and increased gross value added.
- A commitment to work with the existing **Advanced Manufacturing Technology Centres** to use existing resources to develop a network where the centres can identify research synergies and share best practice. This builds on the Manufacturing Strategy announcement of a new build Manufacturing Technology Centre in Coventry to open early 2011.

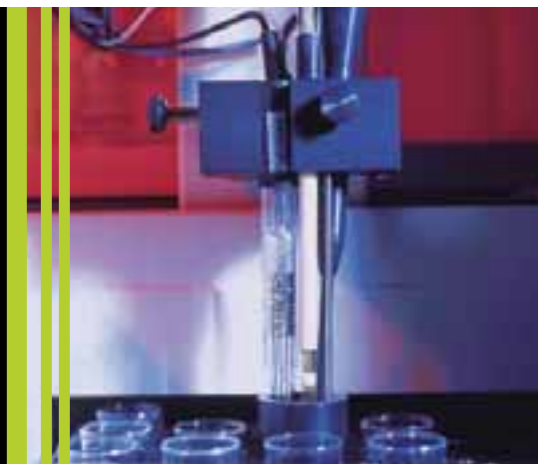
2. Advanced Manufacturing skills

Globally competitive Advanced Manufacturing in the UK is completely dependent on a highly skilled workforce. Advanced Manufacturing requires a complex set of flexible skills, including high technology as well as flexible interdisciplinary skills that enable collaborative working.

Government has taken action to address these complex skills needs. A range of measures are in place to ensure that companies and individuals are getting skills help at all levels to enable the UK economy to grow when economic recovery begins and to improve our skills base to exploit the potential markets for future economic success in Advanced Manufacturing technologies and sectors. These measures include: Apprenticeships (more than 23,500 engineering apprentice starts in 2007/08 in Advanced Manufacturing sectors); Train to Gain Sector Compacts with Semta and Cogent Sector Skills Councils, which cover the Advanced Manufacturing sectors and technologies; National Skills Academies for Manufacturing and for Materials Production and Supply; and Foundation Degrees which are designed with businesses and often delivered in the workplace.

Other forthcoming measures that will benefit manufacturers include:

- Full implementation of the **Talentmap**, a web-based tool which enables employers to quickly and easily access information on education, employment and skills.
- The **Higher Education Framework** (to be published later this year) will set out how the activist approach of *New Industry, New Jobs* will be applied in the HE sector. It will provide a comprehensive overview of the future role of HE, showing how Government will support the HE sector and employers – including those in Advanced Manufacturing – to work together to address skills needs and ensure that the supply of high level skills is more closely linked to strategic priorities and demand from employers.
- Later in 2009 Government will publish a **National Skills Strategy** that will set out how we plan to build on previous work to put in place an approach to skills policy which prepares Britain for the upturn. Advanced Manufacturing skills will be a critical component of this approach. We will sharpen our focus on supporting skills development in those Advanced Manufacturing technologies and sectors that will drive economic growth. To accelerate progress we will work proactively with businesses and our delivery partners.
- A new national **Higher Education Science, Technology, Engineering and Mathematics (STEM)** programme will be launched in August 2009 covering a range of measures: from encouraging an interest in STEM subjects from an early age, through increased A-level STEM entries and HEFCE support for strategically important subjects.
- An **extra 10,000 places for students undertaking higher education degrees in science, technology, engineering and mathematics** have been provided for the Autumn 2009 intake.
- A new Diploma in **Manufacturing and Product Design** will be taught for the first time in schools in September. The Diploma will introduce young people between the ages of 14 and 19 to the manufacturing sector and give them the knowledge and skills needed for employment or further study.
- Government will launch in the Autumn **Manufacturing Insight**, a body developed with industry tasked with improving the public perception of manufacturing and ensuring that young people are aware of the career opportunities available.



Fairline Boats: Power Boats

The UK remains pre-eminent in the construction of complex naval ships. The absence of commercial shipbuilding has in part been compensated by the development of the leisure marine industry. The total revenue of this sector for 2007–8 was £3.1bn of which the value added contribution was 35%. Some £807m of sector turnover is represented by motor and power boat manufacture of which 60% is export sales

Fairline Boats is a world leader in the 38-80ft powerboat sector. All of Fairline's powerboats are designed, engineered and manufactured in the UK and 85% of the companies output is exported to other countries. The high quality of their output is assured by a largely UK based supply chain. Fairline's preferred supplier of exhaust systems is Halyard Marine, itself a leader in the design and manufacture of marine exhaust silencing and engine noise reduction solutions.

www.fairline.com

3. Take up of New Technologies

One of the defining features of the current landscape for Advanced Manufacturing is the emergence of a suite of new platform technologies that are multifunctional and have a range of manufacturing applications. These include, amongst others, the examples cited above of plastic electronics, silicon design, renewable chemicals and carbon fibre composites to replace various metals.

While these technologies are clearly still in the developmental stages, their multifunctionality and their wide potential range of uses create potential substantial economic opportunities but also barriers to their demonstration and adoption. As a result, Government is committed to help maintain and strengthen UK capabilities in these areas. This approach is not company specific but aims to maximise spill over benefits by encouraging use of new technologies with growth potential.

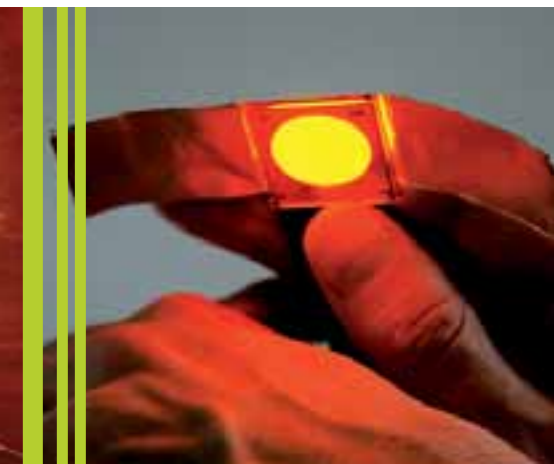
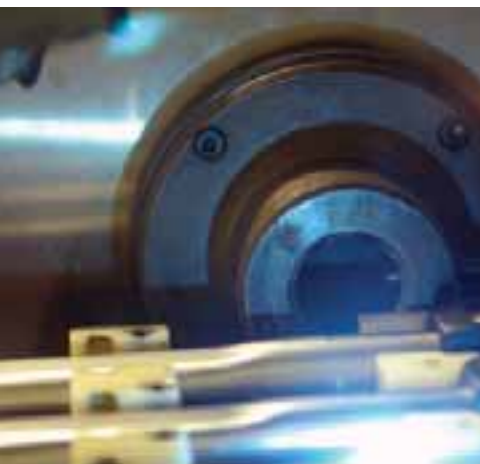
To catalyse technology innovation in areas where there are major opportunities for future growth, Government created the business-led Technology Strategy Board in 2007. The Board focuses on a number of priority areas including high value manufacturing, electronics and photonics, and advanced materials. It supports UK businesses in a number of different ways including through

grants for Collaborative R&D, support for Knowledge Transfer Networks, Knowledge Transfer Partnerships and contributing to the Small Business Research Initiative, which uses Government procurement to drive innovation. The Technology Strategy Board has strongly supported manufacturing technologies by funding research and demonstration programmes for innovative Advanced Manufacturing projects, including in areas such as low carbon vehicles (£140m), technologies for health (£15m), advanced lighting, lasers and displays (£10m), and low carbon energy technologies (£10m).

The Technology Strategy Board, together with additional support from the Biotechnology and Biological Sciences Research Council, will be investing in over 30 projects through its £24m High Value Manufacturing Competition in areas such as healthcare, industrial biotechnology, food, construction, composites and cross-sector Advanced Manufacturing. The projects supported include those focused on the more efficient and effective manufacture of pharmaceuticals and biotechnology products; innovative processing of composites; new advances in the use of lasers; and, increased sustainability and whole lifecycle performance.

Other measures that will also benefit manufacturers include:

- BIS is investing £12 million towards the creation of **industrial biotechnology (IB) open access demonstrator facilities** at Wilton in the North East of England. Additionally, Regional Development Agency One North East has earmarked £1.5 million to secure the day-to-day running of the new site for its first two years and to help strategic partners in the region to access the facilities. These new national facilities will help to identify and deliver new processes, materials and products; and help the translation of novel ideas into new products. It is planned that the new industrial biotechnology open access demonstrator facilities will be fully operational by December 2010.
- Government is in the process of developing a **cross-sector UK composite strategy** to be published in the Autumn which will explore in detail the key challenges for sectors involved in the exploitation of composites and the most appropriate Government intervention. Issues to be explored include: ways to increase the availability of skilled composite engineers, ways to raise the awareness of the capabilities of composite materials, and what steps are necessary to help improve the UK's capacity to produce composite structures cost effectively at the speed and volume required by key markets crucial to the UK's economic future.



New Advanced Manufacturing measures that we are introducing:

- The Technology Strategy Board will invest a further **£5m in collaborative R&D projects** as part of its **High Value Manufacturing competition**, in addition to the £24 million invested earlier this year in projects that have the potential to bring about a step change in the competitiveness of participating companies.
- **Expansion of the Printable Electronics Centre (PETec)**, through an additional £12m investment. This facility was formally opened in March 2009 focusing on display technology, the expansion will enable it to offer capability in manufacturing of ultra-efficient lighting and photovoltaics and contribute to the low carbon agenda. It is estimated that this investment will create around 750–1500 additional jobs and £40–80m worth of value added annually by 2014.
- Investment of £500,000 to **fund innovation activity in the microelectronics design sector**. This investment is part of an industrial roadmap encompassing innovation, skills, networking and, in the future, a Centre of Excellence for Silicon Design in the South West region. The initial project will assist an estimated 250 companies, have a knock on effect to create up to 100 new jobs, and impact up to 200 firms linked to the business cluster.
- Investment in **SAMULET** Research and Technology programme (Strategic Affordable Manufacturing in the UK with Leading Environmental Technology) – a collaborative programme, led by Rolls-Royce, to accelerate the development of manufacturing and product technologies. The programme will focus on productivity and environmental improvements including reductions in raw material usage, efficient Advanced Manufacturing processes and lower engine fuel consumption. The programme will be closely linked with the Advanced Manufacturing research centres (in Sheffield, Glasgow, and Ansty near Coventry) and so strengthen the position of UK aerospace manufacturing and its supply chain. SAMULET is receiving support of £28.5m from Technology Strategy Board, and £11.5m from EPSRC, with further support under discussion with regional bodies.
- An additional £45m from the low carbon element of the Strategic Investment Fund to support research and technology critical to the development of low carbon aircraft engine technology, the importance of which was highlighted in our Low Carbon Industrial Strategy. This funding will be provided through the Technology Strategy Board collaborative R&D delivery programme and used to support high quality industrial and collaborative research led by Rolls-Royce. Currently under consideration by the Board is a research programme called **SILOET – Strategic Investment in Low Carbon Engine Technology** – which is expected to deliver a substantial improvement in engine fuel economy and enable delivery of the Advisory Council for Aeronautics Research in Europe (ACARE) goals.

4. Tackling specific sectoral challenges

While some barriers to market are common to all or most Advanced Manufacturing sectors, their intensity can obviously vary from sector to sector. Levels of capital investment and the degree of specialist skills required, for example, vary from sector to sector. For this reason, and as set out in April 2009 in *New Industry, New Jobs*, the Government has and will continue to develop targeted strategies for sectors and markets.

For example, in the case of aerospace, new projects tend to have high development costs, high technological and market risks and long pay back periods. Government's discretionary provision of **Repayable Launch Investment** for civil aerospace projects recognises that aerospace experiences these characteristics to an unusual degree, meaning that capital markets are typically reluctant to fund their new investments. Negotiations are currently underway to provide **Repayable Launch Investment** to Airbus for wing design and development work in the UK on its new A350XWB (Extra Wide Body) aircraft. This high value-added work at Filton, combined with complex assembly and integration at Broughton in North Wales, will enhance both the company's manufacturing capability in advanced composite wings and the

Ceres Power: low carbon power

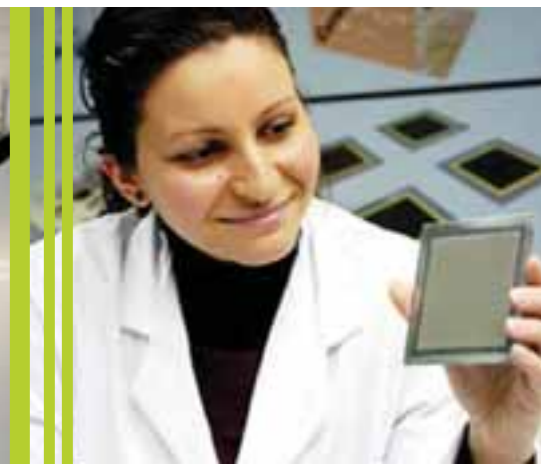
Ceres Power was founded in 2001 in Crawley from work at Imperial College to commercially exploit revolutionary fuel cell technology. With the help of Designing Demand, the Technology Strategy Board and the South East Regional Development Agency it developed its proposition for a Combined Heat and Power (CHP) fuel product and established a volume manufacturing facility to develop and supply CHP units. These low carbon power units through partnerships with Centrica and EDF energy will be ready to install in residential homes in mainland UK from 2011 onwards.

www.cerespower.com

skills of its 10,500 workforce, on what is the most technologically advanced part of the aircraft structure.

We hope to announce the details of this within the next few weeks, subject to reaching satisfactory agreement with the company.

Building on our £113m launch investment support for Bombardier Aerospace (Shorts) in Belfast to design and develop advanced composite wings and the



for the Bombardier CSeries aircraft, and £60m support for GKN at Filton to design and develop the advanced composite wing components (trailing edge and rear spars) for the A350XWB aircraft, represents a solid commitment by Government to work in partnership with the UK's aero-structures businesses to make the UK the world's centre of excellence for advanced large aircraft wings. It also represents a major boost to our aerospace industry in realising its vision for the UK to offer the global aerospace market the world's most innovative and productive location.

Other sectors can offer particularly high value either because they offer strong growth in high technology manufacturing and are an enabling technology for other parts of the economy or the world in which we live. For example, satellite navigation is increasingly ubiquitous, most obviously in 'SatNavs' that help smooth our car journeys and also in mobile handsets – many of the applications offered by the latest mobile phones use space infrastructure. Satellites also monitor climate change, for example, tropical deforestation, polar ice, global temperatures and desertification. They are central to weather forecasting.

For this reason, Government is supporting the creation of a **Space Innovation and Growth Team** to define

a 20-year vision for Space in the UK, the opportunities for businesses and the economy that Space can create, and a plan to start delivering that vision. This team will report early in 2011.

The **Low Carbon Industrial Strategy** also announced support to tackle market failures of manufacturing sectors with the highest economic potential for the UK to take advantage of the opportunities in the move to a low carbon economy, including:

- Up to £120 million to support the development of a British based offshore wind industry, including funding for new offshore wind manufacturing facilities in the UK and for the development and demonstration of next-generation technologies.
- Up to £60 million for a package of measures which will help accelerate the development and deployment of wave and tidal energy in the UK and cement our current position as a global leader in this sector
- Further funding of up to £10 million for the accelerated deployment of electric vehicle charging infrastructure in the UK and the establishment of a cross-Whitehall Office for Low Emission Vehicles (OLEV) that will drive policy development.

New Advanced Manufacturing measures that we are introducing:

A total of £45m funding to Rolls-Royce which will see them build a total of four new manufacturing facilities creating and sustaining around 800 jobs:

Aerospace: **three new Advanced Manufacturing plants** producing:

- Military fan blades for the Joint Strike Fighter aircraft (at Barnoldswick)
- Disks in advanced alloys for fans and turbines of aero-engines
- Single crystal blade castings for high temperature aero-engine turbines

The disks and castings facilities, to be supported with grants for business investment, will be located in Assisted Areas and will focus on the Company's latest high thrust engines.

Civil nuclear: a **new Rolls-Royce factory for civil nuclear components** in an Assisted Area. The company will manufacture, assemble and test large pressure vessels, heat exchangers and other high integrity nuclear island components for the nuclear new-build programme in the UK and overseas. Again, this facility will be supported with a grant for business support.

Rolls-Royce will also be working with other UK nuclear supply chain companies to strengthen their capabilities through the Nuclear Advanced Manufacturing Research Centre (to be located in Northern England) announced in the Low Carbon Industrial Strategy.

Ubiquisys: Revolutionary femtocell technology speeds up mobile connections

Swindon-based Ubiquisys has developed a revolutionary technology to deliver high quality, low cost mobile coverage in the home. Femtocells are small consumer devices the size of a paperback book that connect to the home broadband connection. Mobile users benefit from excellent, high-speed 3G coverage using their existing handset, as well as low-cost voice/data and a platform for exciting new services in the home. Ubiquisys femtocells are manufactured with Sony in Wales and are being deployed today by mobile operators in Europe and Japan.
www.ubiquisys.com



Real help for manufacturers now

There are several programmes and services specifically designed to assist UK manufacturers which are in operation and available now.

- The Manufacturing Advisory Service provides business with practical, hands-on support to improve efficiency, raise productivity, develop new ideas or tackle a problem if you are an SME. All support is either free or highly subsidised.
www.mas.berr.gov.uk
- UKTI has a specific programme targeted at Advanced Engineering and promoting UK companies overseas <http://starturl.com/ipvkd>
- Regional Development Agencies also provide support to manufacturers through a wide range of programmes. More information is available at www.englishrdas.com/
- More information on the specific manufacturing support which business can access now can be found on the BIS website and will be updated as these proposals are implemented
<http://interactive.bis.gov.uk/advancedmanufacturing/>

Advanced Manufacturing – Future Work

The Government's investment in Britain's Advanced Manufacturing capabilities is a continuing process. The work described in this document will be followed with further proposals in the coming months. These include strategies for composite materials and for plastic electronics in the Autumn, which will send clear signals about the opportunities these technologies offer and help manufacturers to identify new commercial applications. We will also publish later this year the Higher Education Framework which will set out a comprehensive overview of the future role of Higher Education, including skills needs in Advanced Manufacturing.

We will continue to develop our thinking and engage with industry on Advanced Manufacturing with the BIS Ministerial Advisory Group on Manufacturing, the Technology Strategy Board, EPSRC, Regional Development Agencies and through wider industry engagement. We will work with Regional Development Agencies and others to ensure that support for Advanced Manufacturing builds on existing strengths and utilises the comparative advantages of different parts of the country.

Advanced Manufacturing is a key strength in the economy at the frontier of new technology, processes and products. It is essential that it continues to have the right long-term framework of support to exploit the new opportunities of the global economy.

