
Research
LIGHTS THE WAY
Innovate UK
Technology Strategy Board
EPSRC
Engineering and Physical Sciences
Research Council

Science supports growth

Growth in the UK economy is largely driven by innovative, technology-intensive companies relying on cutting-edge research in science and engineering to develop world-class products and services.

That's why the government encourages collaboration between UK business and academia to provide technology-based companies with the help they need at crucial stages en route to market.

The Engineering and Physical Sciences Research Council (EPSRC) and Innovate UK are two distinct but complementary government-funded bodies, each with dedicated staff who have a unique and comprehensive understanding of the R&D landscape.

Together we develop the strategic relationships needed to connect the academic and business communities.

We invest across a range of sectors that have the potential to drive economic growth and build the UK's reputation in the global marketplace.

Plastic electronics, highlighted in this brochure, is just one of many emerging industries where our working together has driven development of world-leading technologies.

Plastic electronics

25 YEARS OF DISCOVERY AND INNOVATION

1989

Research at the University of Cambridge, supported by EPSRC, leads to the invention of polymer organic light-emitting diodes (P-OLEDs).

1992

The Cambridge team co-found Cambridge Display Technology to commercialise their patented P-OLED technology.

2000

Professor Richard Friend, Professor Henning Sirringhaus and Stuart Evans form Plastic Logic to commercialise their EPSRC-funded research.

2001

Molecular Vision Ltd is formed as a spin-out specialising in the use of organic LEDs and photodiodes for chemical sensing.

2007

Flexink, an Imperial College London spin-out, is founded by Professor Iain McCulloch and Professor Martin Heeney, helping to enable the industry's emergence.

2007

The Cambridge Innovation and Knowledge Centre (CIKC) in Advance Manufacturing Technologies for Photonics and Electronics is set up with EPSRC and Innovate UK funding.

"EPSRC was quick to provide critical support at the start and has since been effective in funding the UK community across chemistry, physics and engineering, so that it has been consistently world-leading."

Professor Sir Richard Friend, University of Cambridge

Solar innovation

Oxford Photovoltaics

Oxford Photovoltaics, a spin-out company from the University of Oxford, has pioneered a low-cost, sustainable, transparent solar cell coating that can be printed on glass.

The coating can be used on the glass facades of commercial buildings to convert sunlight into electricity and is then able to power the building or feed electricity into the National Grid.

An improved version of the cell has achieved more than 15% efficiency, a level similar to conventional products.

Oxford Photovoltaics was set up by Dr Henry Snaith in 2010 to commercialise his EPSRC-supported research at the university. In 2013, *Nature* magazine named Henry Snaith as one of 10 people who have made the most difference in science during the year. He was the only UK-based scientist on the list.

Oxford Photovoltaics has received Innovate UK funding throughout its lifetime. This includes £100k from a 'Disruptive solutions' competition and £250k from the Smart programme. Now based at Begbroke Science Park near Oxford, it has grown from one member of staff to 10 full-time employees and four consultants.

Chief Executive Officer Kevin Arthur says: "We would still be in the lab if it weren't for Innovate UK – they listened to us when nobody else would – and their faith in our technology is seeing fruition right now – we are world leaders in our field."

The investment has kept coming. By July 2013, the company had secured £4.2m in funding, including an award from the European Commission Seventh Framework Programme for Research.

www.oxfordpv.com

"EPSRC and Innovate UK funding has allowed us to develop a seamless process that can speed innovation from the Swansea University research teams through our pilot line facility, and on to the market."

Kevin Bygate, Business Development Director for Tata Steel Colors and CEO of SPECIFIC, a £20m Innovation and Knowledge Centre co-funded by EPSRC and Innovate UK

Plastic electronics

The global market for plastic electronics, valued at £1bn in 2012, is expected to rise to nearly £25bn by 2020 as organic and other materials are used to create electronic devices and circuits in shapes and forms that have previously not been possible.

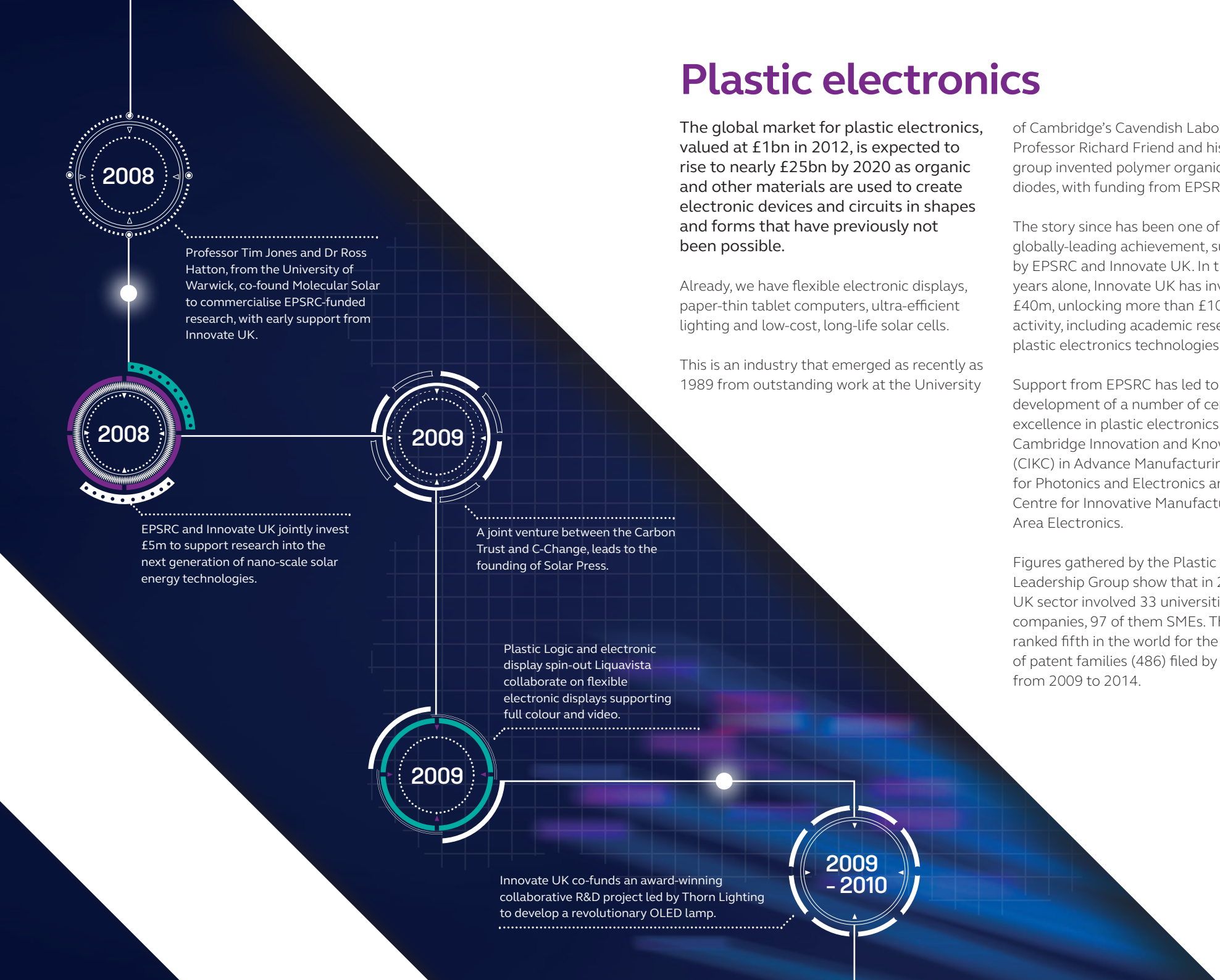
Already, we have flexible electronic displays, paper-thin tablet computers, ultra-efficient lighting and low-cost, long-life solar cells.

This is an industry that emerged as recently as 1989 from outstanding work at the University of Cambridge's Cavendish Laboratory where Professor Richard Friend and his research group invented polymer organic light-emitting diodes, with funding from EPSRC.

The story since has been one of constant, globally-leading achievement, supported by EPSRC and Innovate UK. In the last five years alone, Innovate UK has invested some £40m, unlocking more than £100m of R&D activity, including academic research, into new plastic electronics technologies.

Support from EPSRC has led to the development of a number of centres of excellence in plastic electronics including the Cambridge Innovation and Knowledge Centre (CIKC) in Advance Manufacturing Technologies for Photonics and Electronics and the EPSRC Centre for Innovative Manufacturing in Large-Area Electronics.

Figures gathered by the Plastic Electronics Leadership Group show that in 2013 the UK sector involved 33 universities and 134 companies, 97 of them SMEs. The sector is ranked fifth in the world for the number of patent families (486) filed by inventors from 2009 to 2014.



"We are yet another British company at the forefront of technologies that just a few years ago would have been thought impossible."

Kevin Arthur, CEO, Oxford Photovoltaics

2009 – 2010

The UK government invests £8.4m in R&D in plastic electronics technologies overseen by Innovate UK and including support from EPSRC.

2010

Professor Sir Richard Friend, Professor Neil Greenham and Professor Henning Sirringhaus co-found Eight-19 Ltd to develop organic solar cell technology for manufacture based on work at the Cambridge Innovation and Knowledge Centre (CIKC) in Advance Manufacturing Technologies.

2010

Dr Henry Snaith sets up Oxford Photovoltaics to commercialise his EPSRC-supported research into a solar cell that can be printed directly onto glass or glazing products, able to generate electricity while also transmitting light.

2011

Plastic Logic announces US$700m investment from Russia's RUSNANO for mass production of thin, light and flexible plastic-based e-paper displays.

2011

SPECIFIC Innovation and Knowledge Centre is launched at Swansea University, funded by EPSRC, Innovate UK and the Welsh Government.

2013

Panasonic demonstrates a 4k resolution 56-inch TV using Cambridge Display Technology/Sumitomo Chemical inkjet-printed light emitting semiconductors.

2013

The University of Cambridge's EPSRC-supported Graphene Centre signs a research collaboration agreement with Plastic Logic on graphene in flexible plastic electronics.

2013

Plastic Logic teams up with Intel and Queen's University Ontario to develop Papertab, a flexible, 10.7-inch plastic touchscreen tablet that looks just like a sheet of paper.

2014

The SPECIFIC Innovation and Knowledge Centre, working with Professor Henry Snaith, develops a low-cost printed solar cell design which can be applied to glass as well as metal. It is comparable in efficiency to conventional and commercial solar technologies.

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EPSRC
Engineering and Physical Sciences Research Council

EPSRC

Polaris House
North Star Avenue
Swindon SN2 1ET

Tel: 01793 444000
www.epsrc.ac.uk

Innovate UK

North Star House
North Star Avenue
Swindon SN2 1UE

Tel: 01793 442700
Email: support@innovateuk.gov.uk
www.innovateuk.org

We are...

Innovate UK

Innovate UK is the new name for the Technology Strategy Board – the UK's innovation agency.

We know that taking a new idea to market is a challenge. We fund, support and connect innovative businesses through a unique mix of people and programmes to accelerate sustainable economic growth.

EPSRC

EPSRC is the main UK agency for funding university-based research and PhD-level training in engineering and the physical sciences.

- invests £800m every year
- handles a £3.2bn portfolio of which 40% is in collaboration with industry and other users of research
- works in partnership with around 2,700 businesses and other users of research
- supports more than 9,000 PhD-level students at any given time, around 40% of whom go into industry after graduating.

Driving innovation together

Working alongside other UK research councils and funding bodies, EPSRC and Innovate UK provide support throughout the innovation chain, from academic concepts to product development and commercialisation.

This involves a two-way flow of ideas between business and the science base through channels such as Innovate UK's Knowledge Transfer Network.

As well as its other investments, EPSRC is involved strongly in Innovate UK's funding for innovation. We now have a joint portfolio of more than £250m, including contributions from business.

Examples of joint programmes and centres set up with investment from Innovate UK and EPSRC include £270m investment in quantum technologies; £45m in a new industrial biotechnology catalyst (with BBSRC); and £50m in seven EPSRC-led Innovation and Knowledge Centres.

KNOWLEDGE TRANSFER PARTNERSHIPS | INNOVATION VOUCHERS | FEASIBILITY STUDIES | KNOWLEDGE TRANSFER NETWORKS | CATAPULT | INNOVATION AND KNOWLEDGE CENTRES | CATALYST | COLLABORATIVE R&D

Connecting business with research

Many technology-based engineering businesses say they want to work with the research base but have difficulty finding the right academic and commercial partners. That's where EPSRC and Innovate UK can step in.

Together, we tailor support packages to meet the challenges of an innovation landscape where the journey from research to commercialisation is often tortuous and difficult to predict.

Starting with fundamental support for basic science and engineering projects and continuing to proof-of-concept and late-stage product development, we can help businesses connect with research teams – and research teams with businesses.

More than 150 UK research base organisations, including nearly all UK universities, are working with businesses on Innovate UK projects.

EPSRC's support for university-based research has global economic impact. It ranges from pharmaceuticals to car production and wind turbines to the food industry, underpinning a portfolio of more than 2,700 partnerships with businesses in the UK and overseas, as well as with other users of research.

EPSRC has also forged long-term strategic partnerships with blue-chip companies such as Rolls-Royce, GSK, BAE Systems, Procter & Gamble and Jaguar Land Rover.

For further information on how to connect research with business visit www.epsrc.ac.uk/innovation