TALKING TECHNOLOGY STIMULATING SCIENCE

"DESPITE THE NORTHWEST HAVING EXCELLENT FACILITIES, RESEARCH MONEY IS BEING POURED INTO THE SOUTH EAST. IT MAKES ABSOLUTELY NO SENSE AT ALL TO DO THIS. IN WHAT IS THE WEALTHIEST PART OF THE COUNTRY, HOUSING IS COSTLY AND THEREFORE SCIENTISTS' WAGE COSTS ARE HIGH. IN THE END IT SIMPLY MEANS THAT THE MONEY FOR RESEARCH DOESN'T GO AS FAR AS IT COULD DO IF IT WERE LOCATED HERE."

Geoffrey Piper, North West Business Leadership Team



IT'S TIME TO PRY OPEN THE PUBLIC PURSE

If necessity is the mother of invention, then funding has to be the father, but is the UK putting enough cash into scientific research - especially in the regions?

According to David Clark, director for research and innovation at the Engineering and Physical Sciences Research Council (EPSRC), the public purse has yet to strengthen investment in critical subject areas. "The UK has a proud tradition of funding research, and because of that it has become a centre of excellence across a wide range of scientific fields - but it still needs to improve funding in mainstream and chemical engineering where the quality of the work is high, but the quantity is lacking."

Whilst high-tech industries naturally underpin research into improving and refining their technologies, the element of commercial risk is a natural deterrent to move too far away from the known and familiar. However, the difficulty in achieving funding for 'blue sky' research is, David Clark believes, another opportunity for the government to get its wallet out.

But for Geoffrey Piper, chief executive of the North West Business Leadership Team, funds are being wasted, not because of the nature of the research, but because of the geographical location where it is being undertaken.

"Despite the Northwest having excellent facilities, much of the research money for healthcare and medical science research, for example, is being poured into the South East," he said. "It makes absolutely no sense at all to do this. In what is the wealthiest part of the country, housing is costly and therefore scientists' wage costs are high. In the end it simply means that the money for research doesn't go as far as it could do if it were located here."

As an example Geoffrey Piper cites the Wolfson Molecular Imaging Centre, part of Manchester's Christie Hospital and currently involved in world-class research into cancer treatment. Had the same facility been located in the South East, the set-up and running costs would have been 400 per cent higher. The debacle over Daresbury further endorses the discrepancy.

"This is taxpayers' money that is being spent needlessly. There could be more research across the board if more of it were located outside the South East," he added.

And this may be about to happen. At the end of July, the Northwest Development Agency (NWDA) applauded a House of Lords Science and Technology Committee report which issued a call to government to balance their expenditure on science more fairly across the UK, which could see an extra £100 million a year of government investment in research and development within the Northwest. If adopted, of course.

The report highlights the positive impact scientific development and innovation can have on the economies of the English regions and the key role Regional Development Agencies have to play.

Bryan Gray, chairman of the Northwest Development Agency, said: "I was pleased to note that, following a visit to the region by the House of Lords Science and Technology Committee, several initiatives already in place in England's Northwest have been taken forward in the report. The NWDA is fully committed to the science agenda and will continue to invest in and exploit all opportunities within the sector for the further economic development of the region."

In fact, the NWDA itself intends to invest £130 million in major science-based projects over the next three years, including the National BioManufacturing Facility, the NW Genetics Knowledge Park, InfoLab 21, the National Microsystems Packaging Centre, and a Centre for Environmental Excellence Research and Teaching.

DEVELOPING SKILLS AND SEXING UP THE SCIENCES

Career-wise, the sky's the limit for engineers - unless, of course, you're an aeronautical engineer, in which case you should aim a bit higher.

But the proliferation of 'soft' subjects at our universities - marketing, business, media studies and the like are proving just too tempting for our young people, leaving the UK facing a serious deficit in science and technology graduates. So how do we sex up the sciences?

Dr Michael Sanderson, chief executive of the Sector Skills Council for Science, Engineering and Technology (SEMTA), believes that environmental challenges could be one way to attract young people towards the tougher subjects.

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Ruth Turner, NESTA Talent Scout for the Northwest

*pic may change

After all, it's one thing to say you want to 'help' the environment, but having the skills and knowledge to do so is definitely the better option.

"Science and engineering have a crucial role to play in solving the environmental problems of the modern world. It is our job to let young people know that there are countless exciting opportunities in our field - whether it is bringing clean water to the Third World, cleaning up the environment in the New World or exploring outer space - our sector offers a range of challenges like no other," he said.

And SEMTA is working hard to get students to see these possibilities with a range of Insight courses encouraging sixth formers to experience engineering and science at first hand.

"Last summer, we flew a party of female sixth formers down to the Alps to look at the magnificent engineering that went into making the Tignes Dam there. Each year, we fly dozens of students to spend a week at a foreign university in France, Finland and Spain to give them some idea of the international scope of science and engineering."

Another of the Sector Skills Councils, Lantra - which works with the environmental and land-based sectors - feels that getting to children young enough is paramount in the struggle to turn them on to technology. Marj Walsh, careers and recruitment development consultant for the organisation, said: "We need to get to children at primary school and demonstrate that the skills needed to actively help the environment are science and technology- based. There is a huge range of career options within the environmental conservation sector. We need to show them that a career in science doesn't mean staring down a microscope in a dusty lab all day but that they can actually choose from a wide range of careers."

For the organization charged as champion of the Northwest's environmental technology sector, Envirolink, the skills challenge is very real and very pressing. Having just completed a strategy for skills and learning, Jackie Seddon, Envirolink's chief executive, is keen to turn young people onto technology and plug some serious gaps in the region's skills base.

"Our sector is set to grow dramatically in the future but that growth could be seriously compromised if we don't have a decent supply of science and engineering graduates emerging from our universities," she said. "Renewable energy is a superb example. We're about to see a series of major offshore wind farms developed along our coast which represents a huge opportunity for businesses in manufacture, construction and servicing. To grasp that opportunity and ensure that we don't simply end up importing products and services from outside the region, we are going to have to pull our finger out and start expanding our skills base dramatically."

WANTED: ECO-ENTREPRENEURS

Inventors and investors need each other like the aristocracy needs the nouveau riche - it's a survival thing. So beefing up our environmental innovation is a sure-fire, long-term winner.

And that, according to Colin Hughes, can be a problem. "The Northwest is brimming with ideas, energy and effort on the environmental innovation front, but the reluctance of big investors to put serious money into environmental technologies for the long-term can make it difficult for some ideas to be taken through to commercial exploitation," said the deputy director of the University of Manchester's Environment Centre (UMEC), which runs the Master of Enterprise in Environmental Innovation programme in partnership with the Manchester Science Enterprise Centre.

From traffic counters which distinguish between a bus and a bicycle to a method of super-cleansing surgical instruments, the Northwest is churning out inventions by the cartload, and in the world of the eco-entrepreneur, there are a number of ways to attract seedcorn funding for great ideas. The government's SMART grants and the National Endowment for Science and Technology (NESTA) are just two routes to get start-up money. But, according to Colin Hughes, "once you've passed the proof of concept stage and develop commercially viable capacity", the task of attracting the serious money becomes much more difficult.

Ruth Turner is the Northwest talent scout for NESTA and she agrees that large sums are hard to come by but adds that it is also difficult for people to get 'pre-seedcorn' funds.

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Colin Hughes, University of Manchester Environment Centre

"Seedcorn money is achievable because the idea has been demonstrated and proven to have a commercial future, but sometimes a much smaller amount of money is needed by people who simply have a concept to test and need to do exploratory research," she said.

"It isn't just inventors who have ideas for ways of making our world a better place. We all at some point have an idea which would improve one aspect of our lives and it is unlocking these and taking them out of people's heads and into development which is key to really making progress."

Identifying this aspect of the innovation process has led NESTA to consider a National Ideas Bank - a great idea in itself - which would bring together inventors, manufacturers, investors and those members of the public who simply have an idea they think might work.

Added Ruth Turner: "It's a mistake to think that inventors are always interested in actually manufacturing their idea, often they just want to hand the design over and get on with inventing something else. It's also true to say that normal people may want to simply tell someone about their idea and let them do the rest. Either way, bringing all the parties together ensures that something happens."

Another crucial stage in the process is simply getting advice about how to move forward. Many would-be inventors have discovered to their cost that

commerce is no respecter of intellectual property and whilst the idea may have been realised, the profits have gone elsewhere. In order to help people get through the confusing early stages, NESTA has developed an Inventors Handbook which can be downloaded from their website to guide the inexperienced through the tricky bits.

But is there enough incentive for inventors to turn their talents towards helping the environment? Both Ruth Turner and Colin Hughes agree that there is and, combined with environmentally-friendly changes in government legislation, it looks as though the most profitable inventions of the future will be those which pay more than lip service to the environment and sustainability.

"If you can invent something which has real sustainable benefits, then it's inevitable that you will also make money. It's no longer a choice between making money or being environmentally-friendly: the two go hand in hand," said Ruth Turner.

FOSTERING FAITH IN SUSTAINABLE SCIENCE

The scientific establishment has worked hard to increase public awareness of its role in society ever since the establishment of the Royal Institute in 1799.



Two centuries later, and in the wake of BSE, cloning and GM controversies, that awareness is certainly high but perhaps for the wrong reasons. Have these occurrences permanently dented science's hard won reputation and could we do more to promote better public understanding of science's beneficial side?

Chris Major from AstraZeneca, which employs around 5000 scientists in the UK, believes that the key to promoting a better public understanding of science lies not in highlighting its beneficial aspects, but rather ensuring its limitations are understood.

"The role of science within government policy-making is something we have definitely not got right," he said. "There is a fundamental difference between scientists and politicians - namely that the former deal in probabilities and the latter look for guarantees. This invariably causes misinterpretation and eventually misrepresentation."

The Office of Science & Technology (OST) has created a dedicated team to promote public engagement with science, engineering and technology, and, as well as administering grants and financial support for scientific bodies, is tasked with informing policy-making at government level.

On the side of industry, AstraZeneca houses 40 per cent of its research and development function in the UK (much of it in the Northwest) and has a vested interest in ensuring that public awareness and acceptance of science is encouraged. As well as sponsoring bursary programmes at 20 UK universities, they have established the £20m AstraZeneca Scientific Teaching Trust aimed at exciting the scientific interest of primary school children. For older secondary school pupils, the Inspiring Science project aims to promote science within 2000 secondary schools nationwide.

Chris Major added: "In the mid to long- term, the government and industry are doing a lot to promote science positively in terms of greater resourcing and a wide range of programmes to raise awareness. At the same time, science and technological advancements are becoming newsworthy and achieving more coverage in the media. But if the role of science within policymaking isn't made clear, the issue of public trust and science's reputation becomes a difficult one."



Northwest science strategy

England's Northwest has a strategy for science and as with the wider regional strategy - it has sustainable development as one of its underlying themes.

There was a time when we were less than kind to our innovators. James Hargreaves is a case in point. The hapless inventor of the spinning jenny was a Lancashire man with no formal education, who whittled away with a pocketknife to build the spinning machine that would transform the textile trade and make millions for the cotton and cloth barons of England's Northwest. Famously the 18th Century inventor saw his machines smashed up by angry spinners and failed to secure a patent on his invention.

The situation in the 21st Century couldn't offer a more stark contrast. With a new strategy and partnership for science launched by the Northwest Development Agency (NWDA), our vision is to see England's Northwest become a region renowned as an area of world-class scientific achievement. Our regional science strategy has been designed to act as a magnet for talent and investment, a driver of innovation and enterprise and a force for delivering benefits to health, the environment and society.

Our strengths, our strategy

The strategy - the first to be launched in England - is being developed and delivered by Northwest Science, a partnership of leading business, academic and economic development organisations. Chaired by Sir Tom McKillop, Northwest Science brings together business, university and science partners in the region to promote England's Northwest as a world-class area for science, attract investment and talent and drive innovation.

We have considerable strengths on which we can build. England's Northwest has one of the largest concentrations of universities in Europe with a combined turnover of £1.2 billion. As a result, the Northwest is host to one of the strongest research bases in Europe, and the creation of science parks close to many of our universities has increased the flow of ideas and information to the Northwest's business community, and a number of initiatives have been developed to help accelerate technology and the transfer of knowledge across the small business community.

Delivering our vision for science will take three things: **purpose**, and the determination to realise the vision, shared by all regional partners and supported by resources and commitment; **people**, the talented individuals and teams, from world-leading scientific stars in our major universities and companies, through to talented graduates, to the young people fascinated by

scientific achievement; and **passion**, the same commitment and persistence that put the Northwest at the forefront of technology in the past, and is continuing to do so through a succession of new science-based business ventures.

Delivering our strategy

Our strategy for science includes a practical plan that identifies how the region will capitalise on existing expertise and facilities and build future capacity and knowledge. The strategy highlights the major science challenges for the key Northwest industries and recommends specific actions to tackle these.

A series of targets have been set, covering **Science Excellence**, **People**, **Finance** and **Exploitation** and work has begun on developing action plans covering a number of important industrial sectors, these include biotechnology, environmental technologies, chemicals, aerospace and nuclear energy.

Underpinning the work by these business clusters are a number of supportive elements spanning across the science base.

Leadership will be provided by the Northwest Science Council, and one of its first priorities will be to engage with the public to stimulate **public enthusiasm** and a desire on the part of individuals to develop careers within the region's science-based industries.

Incubation services will be further developed, providing the shared services and advice needed to help start-up firms flourish. We will also ensure that entrepreneurs and companies can access the **flexible financing** required to take good ideas to market. We are also investing in informal **networking** for entrepreneurs, scientists, engineers and financiers and the **promotion** of the region, its many assets and its excellent R&D facilities.

Other supportive elements include the fostering of **academic links** with industry, funds to improve levels of **collaboration** between academic or business institutions, and a **foresight** programme to help our region's scientists, engineers and business leaders develop forward-looking programmes that deliver the technologies that are set to transform the future.

A new era of discovery

England's Northwest has a strong tradition of scientific excellence that has delivered some of the world's leading edge ideas and breakthroughs, from the birth of the world's first test tube baby to the splitting of the atom. Now our region is set to embark on a new era of discovery, innovation and prosperity. To find out more, visit www.northwestscience.co.uk.

Regional Contacts & Context

Northwest Development Agency

The Northwest Development Agency is responsible for the sustainable economic development and regeneration of England's Northwest through the promotion of business competitiveness, efficiency, investment, employment and skills development.

www.nwda.co.uk

Sustainability Northwest

Sustainability Northwest (SNW) is dedicated to promoting and advancing sustainable regional development in England's Northwest through the formation of close partnerships with all sectors in the region and beyond. www.snw.org.uk

Northwest Science Council

Northwest Science is a partnership of leading business, academic and economic development organisations committed to establishing a common vision for science in the region and developing strategy to make things happen. www.northwestscience.co.uk

Envirolink Northwest

Envirolink Northwest exists to promote, strengthen and support environmental technologies and services companies in England's Northwest. www.envirolinknorthwest.co.uk

National Centre for Business and Sustainability

The NCBS is a solutions-oriented consultancy, set up to help organisations improve their environmental and social performance in ways which make business sense.

www.thencbs.co.uk

The Environment Agency

The Environment Agency are the leading public body for protecting and improving the environment in England and Wales, ensuring air, land and water are looked after by everyone in today's society, so that tomorrow's generations inherit a cleaner, healthier world. www.environment-agency.gov.uk

www.enwionment ugency.gov.u

Mersey Basin Campaign

The Mersey Basin Campaign is a 25 year government backed partnership which brings together local authorities, businesses, voluntary organisations and government agencies to deliver water quality improvements and waterside regeneration throughout the Mersey Basin river system. www.merseybasin.org.uk

Renewables Northwest

Renewables Northwest was founded in 2002 by the Northwest Development Agency, United Utilities and Sustainability Northwest. They are an independent champion for renewable energy in England's Northwest, dedicated to helping the region develop the policies, technologies and business opportunities that will bring about a renewables revolution.

www.renewablesnorthwest.co.uk

Northwest Regional Assembly

The Assembly was formed in 1997 and is made up of partners representing all 46 Local Authorities in the region and key Economic and Social stakeholder representatives. The Assembly brings together representatives from the public, private and voluntary and community sectors, providing a forum for discussion of regional issues, and for agreeing a regional approach to strategic issues. www.nwra.gov.uk

Government Office for the Northwest

The Government Office represents Central Government in the region and feeds back the region's views to Whitehall. They aim to work with regional partners and local people to increase the prosperity of the region, promote sustainable development and tackle social exclusion. www.go-nw.gov.uk

The Joule Centre

Created by a partnership that includes the Northwest's universities, commercial organisations and stakeholders in the energy industry, the Joule Centre is being developed as an international leader on research into new, sustainable energy technologies, energy efficiency, demand-side management and integrated assessments of the energy system. The centre helps partners from the higher education and private sectors meet, exchange information and develop joint programmes and projects. It recently led a bid by a range of partners to establish the proposed new UK Energy Research Centre and has succeeded in passing through to the bid's second round.

www.joulecentre.org

Digital Bibliography: Resources online

ALL OF THE FEATURES IN IE ARE RESEARCHED BY A DEDICATED TEAM BASED AT SUSTAINABILITY NORTHWEST AND THE NATIONAL CENTRE FOR BUSINESS AND SUSTAINABILITY. FURTHER INFORMATION ON THE ISSUES AND ORGANISATIONS FEATURED IN IE CAN BE FOUND ONLINE AT THE ADDRESSES BELOW.

Sustainable science in the Northwest

Manchester Metropolitan University www.mmu.ac.uk Northwest Science Council www.northwestscience.co.uk Liverpool John Moores University www.livjm.ac.uk UMIST www.umist.ac.uk

University of Central Lancashire www.uclan.ac.uk University of Manchester www.man.ac.uk University of Lancashire www.lancs.ac.uk University of Liverpool www.liv.ac.uk University of Salford www.salford.ac.uk

The great leap forwards

Bolton Institute www.bolton.ac.uk BT www.btplc.com/innovationandtechnology Cafe Scientifique www.cafescientifique.org Foresight www.foresight.gov.uk PREST www.man.ac.uk/PREST Regional Futures www.regionalfutures.org.uk Tomorrow Project www.tomorrowproject.net Sustainable Urban and Regional Futures www.surf.salford.ac.uk

Building new benchmarks for design and construction

Association for Environment Conscious Building www.aecb.net BRE www.bre.co.uk CUBE www.cube.org.uk CIRIA www.ciria.org.uk CABE www.cabe.org.uk Fourth Grace www.liverpoolfourthgrace.co.uk Stephenson-Bell Architects www.stephenson-bell.com Taylor Woodrow www.taywood.co.uk Terry Farrell www.terryfarrell.com The Centre for Sustainable Design www.cfsd.org.uk

Heroes of the industrial evolution C-Tech Innovation www.capenhurst.com Envirolink Northwest www.envirolinknorthwest.co.uk Environmental Industries Federation www.eif.org.uk Joint Environmental Markets Unit www.jemu.org.uk Trade Partners UK www.tradepartners.gov.uk

Natural remedies

Brownfield Remediation to Forestry Group www.livjm.ac.uk/brownfield CURE www.art.man.ac.uk/planning/cure DTI SMART awards www.smartwise.org.uk Manchester Science Enterprise Centre www.msec.ac.uk Mersey Forest www.merseyforest.org.uk Mineral Solutions www.mineral-solutions.co.uk Shell www.shell.co.uk SIReN www.claire.co.uk/siren Stockholm Environment Institute www.york.ac.uk/inst/sei

Warrington Borough Council www.warrington.gov.uk

Nuke know-how: nuclear decommissioning and Northwest expertise British Nuclear Fuels www.bnfl.com Nuclear Decommissioning Agency www.dti.gov.uk/nuclearcleanup UKAEA www.ukaea.org.uk Westlakes Research Institute www.westlakesresearchinst.org

Crunch time for carbon

AMEC www.amec.co.uk Bendalls Engineering www.bendalls.co.uk British Photovoltaic Association www.pv-uk.org.uk British Wind Energy Association www.bwea.com DTI Renewables www.dti.gov.uk/renewable Enviros www.enviros.com National Windpower www.natwindpower.co.uk Renewables Northwest www.renewablesnorthwest.co.uk Solar Century www.solarcentury.co.uk The Carbon Trust www.thecarbontrust.co.uk The Intergovernmental Panel on Climate Change www.ipcc.ch The Tyndall Centre www.tyndall.ac.uk UK Climate Impacts Programme (UKCIP) www.ukcip.org.uk UK Offshore Wind Development www.offshorewind.co.uk Wind Prospect www.windprospect.co.uk United Utilities www.uuplc.com

The right resource, in the wrong place

Biffa www.biffa.co.uk Blue Peter www.bbc.co.uk/cbbc/bluepeter CORUS www.corusgroup.com ENWORKS www.enworks.com Institute of Waste Management www.iwm.co.uk The Clean Merseyside Centre www.clean-merseyside.com The Energy from Waste Association www.efw.org.uk Waste Watch www.wastewatch.org.uk WRAP www.wrap.org.uk

Bubblingup

APEM Ltd www.apemltd.co.uk EU Water Framework Directive ww.defra.gov.uk/environment/water/wfd Mersey Basin Campaign www.merseybasin.org.uk Mersey Strategy www.hope.ac.uk/ebs/merseystrategy

Talking technology

Biotechnology and Biological Sciences Research Council www.bbsrc.ac.uk Cafe Scientifique www.cafescientifique.org Centre for the Study of Environmental Change www.lancs.ac.uk/users/csec

Engineering and Physical Sciences Research Council www.epsrc.ac.uk

National Endowment for Science Technology and the Arts www.nesta.org.uk National Training Organisation www.nto-nc.org Natural Environment Research Council www.nerc.ac.uk North West Business Leadership Team www.nwblt.org.uk Office of Science and Technology www.ost.gov.uk Science, Engineering and Manufacturing Technologies Alliance www.semta.org.uk Science Policy Support Group www.spsg.org Science, Technology and Mathematics Council www.stmc.org.uk Sector Skills Councils www.ssda.org.uk/ssc UK Research Councils www.rcuk.ac.uk University of Manchester Environment Centre www.man.ac.uk/umec

Publishers

Sustainability Northwest www.snw.org.uk Northwest Development Agency www.nwda.co.uk

Partners

Envirolink Northwest www.envirolinknorthwest.co.uk Mersey Basin Campaign www.merseybasin.org.uk National Centre for Business and Sustainability www.thencbs.co.uk The Environment Agency www.environment-agency.gov.uk

Creative

Creative Concern www.creativeconcern.com Hemisphere www.hemispheredmc.com Studio Liddell www.studioliddell.com Len Grant www.lengrant.co.uk

Regional

Action for Sustainability www.nwra.gov.uk/afs Government Office for the Northwest www.go-nw.gov.uk Knowledge Northwest www.knowledgenorthwest.com Manchester Science and Enterprise Centre www.msec.ac.uk Northwest Portal www.englandsnorthwest.com Northwest Universities Association www.nwua.co.uk

Inspiration

Buckminster Fuller Institute www.bfi.org Bremen Initiative www.bremen-initiative.de Forum for the Future www.forumforthefuture.org.uk Green Futures www.greenfutures.org.uk Institute for Public Policy Research www.ippr.org.uk Mother Jones www.motherjones.com New Economics Foundation www.neweconomics.org Rocky Mountain Institute www.rmi.org Sustainable Development Gateway www.sdgateway.net The Earth Network for Sustainable Development www.ecouncil.ac.cr The UK Sustainable Development Commission www.sd-commission.gov.uk

Tomorrow Magazine www.tomorrow-web.com Wuppertal www.wupperinst.org