



Daresbury Science
& Innovation
Campus

Energy

Shaping the Future of Science and Innovation

Daresbury Science and Innovation Campus (Daresbury SIC) is an internationally recognised location for high-tech businesses and leading-edge science, recognised recently as the Outstanding Science Park* by members of the United Kingdom Science Park Association.

Its remit goes beyond that of a traditional science park by representing a fundamentally new approach to driving UK competitiveness in global science and innovation. Daresbury SIC was formed by the Northwest Regional Development Agency (NWDA), the Science & Technology Facilities Council (STFC), Halton Borough Council and the research intensive universities of Lancaster, Liverpool and Manchester. It is one of two national Science and Innovation Campuses, the other being at Harwell in Oxfordshire.

The Campus provides a unique environment for innovation and business growth offering major opportunities to the energy sector for knowledge exchange and the development of collaborative activities. Partners on Campus include the STFC Daresbury Laboratory, the Cockcroft Institute (The UK Centre for Accelerator Science) and The Daresbury Innovation Centre.



*2009 Award

Technology Exchange

The facilities and services of Campus stakeholder STFC, managed by its leading research groups active in a number of energy related areas, can be accessed through its knowledge transfer organisation STFC Innovations Ltd, which progresses individual projects through various business models to the point of implementation as commercial licenses or spin-out companies.



STFC Innovations Ltd

Meeting the Grand Challenge

STFC manages a number of leading-edge facilities which are of key importance to the energy sector. It provides this capability through its large scientific facilities at Daresbury and its sister Campus at Harwell. The pairing of the Campuses, known as the 'dipole', enables any organisation engaging with one Campus to have access to the facilities of both.

Conservative estimates suggest that world power consumption will almost triple by 2050. STFC is working on this issue through its Futures Programme, which addresses the government's energy Grand Challenge theme. Scientists are intensively

researching cutting-edge sustainable technologies, using multiple facilities such as the ISIS neutron source at Harwell and supercomputers for molecular dynamics simulation at Daresbury.

STFC Energy Research Unit

STFC's Energy Research Unit (ERU), established over 25 years ago has an international reputation in wind energy research, providing collaborative energy R&D with UK academics and industry and outdoor test facilities for new and

renewable energy research. World-class scientific expertise is applied in cutting-edge research on wind turbines, hydrogen storage and sustainability, with more than 200 research papers published internationally.



Harwell SIC



Daresbury SIC

www.daresburysic.co.uk/sectors/energy

A Leading Location

Renewable energy is a fast-growing industry in the UK, driven by a vibrant environmental technologies and services sector.

The sector provides over 50,000 jobs producing an annual turnover of almost £3 billion. In the North West, in addition to the Sellafield nuclear power plant and traditional fossil fuel plants there are more sites generating electricity from renewable sources than any other English region, creating a wealth of opportunity for further development and new jobs.

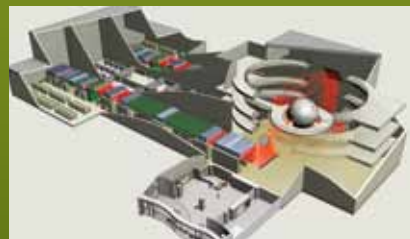
England's Northwest has been chosen as a Low Carbon Economic Area for Nuclear (LCEA), based on the region's unique assets and capabilities within the field of nuclear energy. As part of the UK's Low Carbon Industrial Strategy, the LCEA will be led by the Northwest Regional Development Agency (NWDA) to bring together knowledge, skills and investment within the sector, delivering benefits for the economy.

Working in Partnership

The HiPER Project (High Power Laser Energy Research facility)

STFC leads the HiPER project, in collaboration with leading research institutions and industry from a number of European countries. HiPER will demonstrate the feasibility of laser driven fusion as a future energy source. Fusion is extremely attractive as it will provide a clean (no greenhouse gas emissions or long lived radioactivity) and secure energy source for the future.

HiPER is based on the concept of laser-driven fusion where small amounts of Deuterium and Tritium (Hydrogen isotopes) are injected into a vacuum chamber and heated by a number of lasers. At high temperatures they fuse, producing Helium and neutrons whose energy can be captured to drive a steam turbine.



The project is currently assessing technology options to take forward to the subsequent prototyping phase. Construction of the HiPER facility is envisaged to start in the latter half of the next decade with operation in the early 2020s.

Did you know?

England's Northwest has more sites generating electricity from renewable sources than any other English region.

From Large Facilities to Commercial Science



The Campus' aim to open up access to its scientific facilities has led to large scale facilities finding commercial application in areas such as renewable energy, novel fuels and nuclear research. Examples include:

Photovoltaics

Solar panels are potentially the future's mainstream means of generating renewable energy, but are currently relatively inefficient due to the limited range of wavelengths that activate them. To address this, STFC scientists have used high performance computing facilities to model Intermediate Band Solar Cells, which allow the absorption of varied wavelengths.

Hydrogen Storage

Hydrogen, possibly the fuel of the future, is limited currently by the problems associated with storage.

With the help of a GEM diffractometer at the STFC-based ISIS neutron facility, a group has investigated a number of new candidate hydrogen storage materials.

Radiation Containment

With the growing need to immobilise radioactive nuclear waste safely, STFC is carrying out massive molecular dynamics simulations to predict the changing properties of waste forms over time and the impact of highly energetic particles on potential encapsulation materials.

www.daresburysic.co.uk/sectors/energy

A Growing High-tech Community

The Campus has become increasingly attractive to companies from the energy and environmental sectors.

These include:

- **National Skills Academy for Nuclear** – set up by nuclear employers and supported by government. The Skills Academy's most important development is The Nuclear Skills Passport – a means of standardising qualifications and training across the breadth of the nuclear industry.
- **Ecomix** – a Daresbury SIC based high-tech company that has developed an engine management unit which significantly increases the engine's efficiency, reducing diesel consumption by more than a fifth, and CO₂ output by 11%.
- **Structure Vision** specialises in software applications, including NuPlant – software that provides a structured, collaborative analysis environment delivering detailed insight into the decommissioning process for nuclear power plants.



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The Future for Daresbury SIC

As part of a wider £104m investment in technology gateway centres (outward focused hubs for collaborative R&D into large scale scientific challenges) the government has earmarked over £60m for two centres at Daresbury SIC. The Hartree Centre will be a new kind of computational science institute for the UK enabling cutting edge research in computer modelling playing a key role in areas such as climate modelling and radiation containment. It will be joined by a centre for sensors and detector systems.



Business at the Heart of Science

The Campus is home to almost 100 high-tech businesses, ranging from small start-ups to strategic units of large multi-national corporations, and offers high quality office space alongside its multidisciplinary laboratory facilities.

Facilities and accommodation within the Daresbury Innovation Centre include:

- A recognised research & development focused environment with an STFC account manager enabling companies to access the facilities of the STFC
- Links to a wide network of research intensive universities
- Opportunities for technological and commercial collaboration
- Excellent transportation links
- Tailored business support and connections to major funding streams
- A spacious rural location in Cheshire



Flexible Laboratory Facilities

The Campus also offers flexible and affordable access to cutting-edge scientific equipment and laboratory space for high-tech research and development work through the Innovations Technology Access Centre. Here businesses can develop their innovations by making use of more than £3m of cutting-edge equipment in fully-equipped materials, physical science, biological and imaging laboratories.

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Putting Business at the Heart of Science