ENERGY INNOVATION DISTRICT

A proposal by the Cheshire Energy Hub
for the creation of an Energy Innovation District

August 2017
Executive Summary

The UK Government Green Paper: Building our Industrial Strategy published in January 2017, details the key success factors to enable increased productivity and more balanced growth in the UK’s economy. Specifically it describes how:

“Places with higher rates of investment in research and development, more highly skilled people, better infrastructure, more affordable energy and higher rates of capital investment grow faster and have higher levels of productivity. Policies on trade, procurement and sectors are tools we can use to drive growth by increasing competition and encouraging innovation and investment. Through central government actions and by strengthening the local institutions that support a more productive economy we can ensure that growth is driven across the whole country.”

The Green Paper also details ten ‘pillars’ on which the success of the strategy will be built:

1. Investing in science, research and innovation
2. Developing skills
3. Upgrading infrastructure
4. Supporting businesses to start and grow
5. Improving procurement
6. Encouraging trade and inward investment policy
7. Delivering affordable energy and clean growth
8. Cultivating world-leading sectors
9. Driving growth across the whole country
10. Creating the right institutions to bring together sectors and places

This document details the activities of a group of energy intensive manufacturing companies and leading energy companies, who came together in 2013 to form the industry led Cheshire Energy Hub; a group of companies who have already begun to address many of the ten pillars as a means of driving growth in their own businesses and more importantly broader economic development within Cheshire, with wider benefits for the UK.

The Cheshire Energy Hub have summarised this on-going collective activity into a single ‘pitch’ to government for the creation of an Energy Innovation District. The components of the district ‘map’ exactly onto nine of the ten pillars of the Industrial Strategy and if our proposals were adopted nationwide using the District as an exemplar project, would succeed in delivering the remaining one – that of ‘Delivering growth across the whole country’.

This proposition document details the ideal components of a low carbon Energy Innovation District, describes what the Cheshire Energy Hub have achieved so far and outlines those areas where some level of central government assistance may be beneficial.

The outcome of the delivery of an Energy Innovation District will be:

• The creation of an exemplar business district with UK wide application and of international significance
• Over £7bn private sector capital investment
• Around £2.3bn gross value added per year
• Over 33,700 new full time equivalent jobs
• 480 hectares of land developed

To make this happen we are asking for:

• The Energy Innovation District to benefit from an extension of the Cheshire Science Corridor Enterprise Zone in relation to energy companies
• The ability for the LEP to retain business rates from occupiers moving into the Energy Innovation District to enable the LEP to underwrite and de-risk up-front investment in micro-grid and gas infrastructure
• Enhanced capital allowance benefits to underground gas storage companies and a review of the approach to determining the rateable value of underground storage assets
• The provision of a regulatory system that supports the delivery of a District wide micro-grid, distribution connected generation and energy storage, hydrogen and bio-methane injection to the grid and the support of hydrogen trials and pilot hydrogen storage
• A review of Energy Intensive Industry benefits to provide short term support for companies as the Energy Innovation District becomes established
• A review of Carbon Capture and Storage feasibility in the Southern Irish Sea
• BEIS Heat Network Delivery Unit to widen their heat focussed remit to incorporate power in order to provide a total energy dynamics solution
• Government to provide a clear policy and regulatory framework in which technology innovation and trials can be developed in the automotive sector
• Innovate UK to engage specifically in a project to determine the potential role of electric vehicles within a significant micro grid to provide local balancing services
• The identification of the Energy Innovation District as a strategic area for the deployment of funding support for energy innovation
Introduction

Energy is a potential smart specialisation area for Cheshire and Warrington – a specialism that could be used to benefit the UK in global markets. We have a critical mass of energy know-how and R&D particularly in the nuclear and energy systems fields and a significant base of energy intensive industries along the Cheshire Science Corridor in automotive, advanced manufacturing, chemicals and glass that require a secure, stable and affordable energy supply. The energy sector in Cheshire and Warrington already employs 31,000 people in 7,000 businesses, including 30 businesses employing 250+ people.

The Energy Innovation District is an existing and developing cluster of energy related industry, which includes large scale energy assets, energy intensive industries, the associated supply chain and a centre for Research and Development. The objective within the District is to provide secure, low carbon and lower cost energy – promoting indigenous growth, encouraging inward investment and stimulating innovation. It is important that in delivering a new energy system, that the economic benefits for the region and the country are maximised, securing, wherever possible, the supply chain opportunities.

The Energy Innovation District will provide the blueprint for how this is achieved and how the approach can support a modern industrial strategy and encourage global investment.

This is a destination led proposition and will provide a template for collaboration between sectors that will provide greater clarity in delivery and the direct application of the Energy Innovation District approach across other geographies of the UK – developing a blueprint for an exemplar business district of international significance.

The fundamental ‘Ask’ of Government is to provide an environment that can facilitate private sector investment in the energy infrastructure that will result in secure, low carbon and lower cost energy. Significant up-front investment is required in the delivery of infrastructure – connecting business to new forms of energy. Commodity and user charges will ultimately support this investment but additional support is required in the early phases to stimulate and de-risk initial investments.

The Energy Innovation District will offer the following Enterprise Zone-style incentives for the first 5-years in order to stimulate investment:

1) Guaranteed lower energy costs within the Energy Innovation District
2) Enhanced Capital Allowances for large-scale energy and infrastructure investments
3) Business rate discounts to stimulate the SME supply chain

As with Enterprise Zones, the LEP would retain all new Business Rates generated within the Energy Innovation District for 25-years, which would be used to underwrite the up-front investment in energy generation and infrastructure. Other interventions around regulation will facilitate the innovative supply of energy. In addition, we would like to explore the potential to extend Enhanced Capital Allowances to include large-scale gas storage across Cheshire and Warrington, in order to stimulate further private sector investment.

The Cheshire Energy Hub is promoting the creation of an Energy Innovation District.
What is the Cheshire Energy Hub?

The Cheshire Energy Hub is an energy sector support organisation, which has been entirely funded and strategically driven by industry. It works with its member organisations and key stakeholders in promoting collaborative action, advancing the skills agenda and working towards business solutions. It initially established a successful Graduate Recruitment Programme and now provides the conduit for collaboration across various energy initiatives.

Members include C-Tech Innovation, EA Technology, Encirc, Essar Oil UK, Peel Environmental, Protos, Storenergy UK and URENCO, together with the Cheshire & Warrington Local Enterprise Partnership, Cheshire West and Chester Council and the University of Chester: Thornton Science Park.

This existing cluster represents an area that currently consumes around 5% of the UK’s energy and contains some of the UK’s most significant and energy intensive infrastructure, including Ineos Chlor, Essar’s Stanlow Refinery, CF Fertilisers, Encirc and URENCO.

An Energy Innovation District has a number of key components to make it function successfully:

1. **Partnership Networks** – integrating existing and complimentary partnerships to maximise the benefits to all parties. Both public and private sector institutions working both in the geographic region but also across the UK.

2. **Innovation** – recognising that the key to growth is for industries to continue to develop and strive to be world leaders. Innovation is key to a vibrant and successful economy.

3. **Industry** – through an already productive and highly skilled platform, existing industry provides the basis of future growth in key sectors.

4. **Connectivity** – Having a network of infrastructure which is fit for purpose in both capacity and capability for transport, utilities, and digital is key to facilitating success.

5. **Business Support Initiatives** – removing the barriers to entry which face SME’s in particular, to allow them to perform effectively and grow/scale up.

6. **Enabling Initiatives** – proactive collaboration between the public and private sector to further understand the opportunities for innovation and growth across the District through focussed projects and research.

7. **Skills** – from a platform of an already highly skilled and productive workforce, the Energy Innovation District will shape the skills and qualifications needed generating a future pipeline of skilled labour from within the UK. Ensuring that industry and academia work symbiotically to provide a skilled workforce to enhance the emerging industry and keep the UK at the forefront of the global market.

Within the existing cluster, and proposed Energy Innovation District, we can demonstrate significant progress in these key elements, providing a strong baseline position from which the blueprint for a successful model for the UK is developed.

Over 5% of the UK’s energy used in this area
Cheshire Science Corridor Enterprise Zone

The Cheshire Science Corridor Enterprise Zone (SEP), and an integral component of the Devolution Growth proposal to Government, is one of the key strategic development priorities of the Cheshire and Warrington economy. Going forward, it offers significant growth potential, as new technologies break, behaviours continue to change and UK energy policy imperatives become clearer. Importantly, there is also significant scope for Cheshire and Warrington to exploit synergies with emerging energy cluster development activity in neighbouring LEP areas.

The long term ambition for the Region is set out in the Strategic Economic Plan ‘Cheshire and Warrington Matters’.

Cheshire & Warrington LEP - Cheshire & Warrington has a diverse economy and this is one of its strengths. The energy-related sector forms a strategically important part of the Cheshire and Warrington economy. Going forward, it offers significant growth potential, as new technologies break, behaviours continue to change and UK energy policy imperatives become clearer.

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Cheshire Science Corridor

The Cheshire Science Corridor stretches across the Cheshire and Warrington sub-region incorporating three local authority areas. It recognises and capitalises on the fact that the area already incorporates some of the most significant national and international science based businesses and research establishments. Awarded Enterprise Zone status in 2016, it brings together some of the best opportunities for new development and attraction of new businesses within the corridor. Covering over 100 hectares, it has the potential to attract in the order of 20,000 jobs and 500 businesses to Cheshire and Warrington through a significantly enhanced profile; attractive business incentives and the ability to retain and reinvest new business rate revenue.

The long term ambition for the Region is set out in the Strategic Economic Plan ‘Cheshire and Warrington Matters’.

Partnership Networks

Energy Innovation Centre - The Energy Innovation Centre was launched in 2008 to accelerate the discovery, development and deployment of innovation among the transmission and distribution network. It supports the innovation ambition of industry partners from the gas, electricity and renewables sectors by driving forward collaborative innovation projects that will help transform the energy system.

www.energyinnovationcentre.com

Cheshire Science Corridor - The Cheshire Science Corridor is one of the key strategic development priorities in the LEP 2014 Strategic Economic Plan (SEP), and an integral component of the Devolution Growth proposal to Government. www.cheshiresciencecorridor.com

Mersey Dee Alliance - The Mersey Dee Alliance (MDA) objective is to enhance the profile and identity of the North Wales/North West border region and maintain and develop the regions competitiveness. The partnership was formed in April 2007, and comprises the local authorities of Cheshire West and Chester, Flintshire, Wrexham Gyndwr University, Wirral, Wrexham, and the Welsh Government, Merseytravel and the University of Chester.

The North East Wales/West Cheshire/Wirral area is unique in the UK as a major economic area with a population of close to 1 million divided by a national boundary. The area has a great diversity of businesses including aerospace, the automotive and chemical industries, financial services and other advanced manufacturing. It has a metro economy as well as a large rural hinterland and coastal commuter belt and is a major contributor to the UK economy. The MDA addresses the strategic, cross-boundary issues that affect the area as a whole so as not to duplicate local activity and to ensure it creates added value.

North West Hydrogen Hub – A group of 15 companies working together to develop a hydrogen hub which will incorporate commercial scale fuel cells, encompass hydrogen as a transportation fuel and as a source of heat. Centred around Protos, Thornton Science Park, and neighbouring industry as a producer of hydrogen; the hub offers a route to an industrial scale market in terms of resources, technical expertise, development land and market connectivity. It seeks to share information with other leading edge initiatives investigating the potential of hydrogen across the UK to ensure a coordinated approach to innovation in this field.

Carbon Capture & Storage Association (CCSA) - The Carbon Capture & Storage Association (CCSA) was launched in March 2006 to represent the interests of its members in promoting the business of capture and geological storage of carbon dioxide (known as Carbon Capture and Storage, or CCS) as a means of abating atmospheric emissions of carbon dioxide and tackling climate change. From its base in London the CCSA brings together specialist companies in manufacturing & processing, power generation, engineering & contracting, oil, gas & minerals as well as a wide range of support services to the energy sector such as law, banking, consultancy and project management.

UK Carbon Capture & Storage Research Centre - The UK Carbon Capture and Storage Research Centre (UKCCSRC) leads and coordinates a programme of underpinning research on all aspects of CCS. The UKCCSRC brings together over 250 of the UK’s world-class CCS academics to provide a national focal point for CCS research and development. The Centre is a virtual network where academics, industry, regulators and others in the sector collaborate to analyse problems, devise and carry out world-leading research and share delivery, thus maximising impact.

The East Irish Sea CCS Cluster Technical Report 2011 - identified six mini clusters including a North Wales Cluster and a North West Cluster.

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Innovation

Thornton Science Park - is a major research and innovation hub owned by the University of Chester, which offers a unique blend of industry, innovation and academia. Thornton Science Park is a centre of excellence for energy systems and also provides on-site business support for the energy sector, targeting commercialisation and internationalisation. Areas of expertise include: energy storage; energy networks; asset management and unconventional gas extraction. Thornton is also a spoke for the National College for Onshore Oil and Gas.

Thornton Science Park has recently created a £17m Intelligent Energy Systems Demonstrator (supported by LGF and ERDF) and is the chosen location for the the UK Geoenergy Observatories project; a £31 million capital infrastructure project commissioned by The Natural Environment Research Council (NERC), the UK’s main agency for funding environmental sciences, and delivered by the British Geological Survey (BGS), the UK’s leading research centre in geoscience. The delivery of these activities, through a number of interrelated projects, has the potential to deliver up to 4,000 direct jobs and an increase in GVA of up to £205m in the medium term, with huge potential for further growth beyond initial developments as the true value of the site is realised.

www.thorntonsciencepark.co.uk

The Energy Centre at Thornton - provides a flexible space where industry and academia are able to come together to innovate, develop and demonstrate new intelligent energy technologies. The facility seeks to promote growth and acceleration in the development and exploitation of technologies for the energy market.

Key features of the Energy Centre

- Ground floor test bays with high ceiling (7m), concrete resin floor and roller shutter doors enabling access for large units and equipment
- A suite of equipment including an intelligent multi-vector micro-grid
- Purpose built industrial space to build, develop, evaluate and showcase new and innovative energy technologies
- Large scale testing and modelling facilities
- High quality office and laboratory space

www.chester.ac.uk/node/39830

Capenhurst Technology Park - A centre for technology and energy focussed enterprises, Capenhurst Technology Park offers good quality office, laboratory, warehousing, and production units in a parkland setting, comprising 18,500 sq m of accommodation. It accommodates a number of the specialist providers including:

- C-Tech Innovation - a global new product development and innovation management company
- EA Technology - a world leader in products and services which enhance the performance, reliability, safety, and cost-efficiency of power assets
- Enrichment Technology Limited – an innovative technology company committed to the safe, competitive, and sustainable delivery of enrichment technology services and energy solutions
- Flowgroup plc - has developed a patented technology platform (affordable microCHP boilers) that is designed to become a leading domestic heating technology worldwide
- The Capenhurst Technology Park is owned by URENCO (UK) Limited which is a wholly owned subsidiary of URENCO Limited. The site has established itself as a highly successful operation, expanding its production capacity to 4,900 tSW/a by the end of 31 December 2015, and contributing to the Group’s objective of being the leading international supplier of enriched uranium and associated technologies

www.capenhursttechnologypark.co.uk
Industry

Essar Oil (UK) Limited - Essar Oil UK owns and operates the Stanlow Manufacturing Complex in Ellesmere Port. Stanlow plays a key part in the national economy, producing over 16% of the UK's transport fuels. With over 900 highly-trained staff and the largest residue cat cracker in Europe they are one of the biggest refineries in the country.

CF Fertilisers UK – the UK head office and manufacturing plant located at Ince adjacent to Protos consists of 1 ammonia, 3 nitric acid plants with a further nitrogen fertiliser plant and 3 compound lines. With approximately 400 employees, Ince produces 1 million tonnes of fertiliser per annum and supplies the key market sectors for grass and arable farming.

Encirc - With over 33% market share, Encirc manufactures container glass for the food and beverage industry. Their state-of-the-art contract bottling facility at Elton next to Protos, the largest of its kind in Europe, employs over 300 staff and produces 440,000 of tonnes of glass.

URENCO UK Ltd - Located in Capenhurst, near Chester, the site operates three plants producing enriched uranium to enable nuclear power stations around the world to generate electricity. URENCO uses world-leading centrifuge technology to provide uranium enrichment services to generate low carbon nuclear energy. The site employs over 300 people.

This existing cluster means that there is already a strong understanding of the sector and the opportunity to drive efficiencies through the co-location of supply chain business.

In order to deliver growth and investment there needs to the availability of land on which business can locate and grow. Within the District there is 480 hectares (1,200 acres) of development land suitable for a range of energy related industry and the associated supply chain. 59 hectares of this is currently allocated within the existing Cheshire Science Corridor Enterprise Zone.

Key developments include Protos, land at Stanlow/Thornton Science Park, Ellesmere Port and Storengy UK Underground Gas Storage facilities.

Storengy UK is operating the Stublach facility in Cheshire, a state of the art flexible asset, one of the most modern storages in Europe. Storengy UK has already spent £350 million and is committed to spend a further £150 million from 2017 to 2019 to double the size of its facility to develop the largest onshore gas storage facility in the UK. [www.storengy.com/en](http://www.storengy.com/en)

With a growing share of UK electricity coming from intermittent renewable production, energy storage will become increasingly important. The salt deposits in Cheshire are ideally suited for the development of large-scale energy storage in the form of hydrogen or compressed air. The expertise required to deliver this is similar to that employed for natural gas storage.

An energy storage cluster could emerge in the Cheshire salt plain in the vicinity of the existing natural gas salt caverns, generating additional investments between £300 – £500m.

£170m has been invested in the development of energy generation assets, with a further £350m planned over the next three years. The overall masterplan would see an investment opportunity of over £1.5bn [www.thisisprotos.com](http://www.thisisprotos.com)
Connectivity

Connectivity between industry and supply networks is key to the success of the District – both in the efficient transportation of goods and people in to and out of the area but also in the supply of energy and utilities.

It is the delivery of secure, low carbon and, critically, lower cost energy that will drive the success of the District in providing economic growth and prosperity. The focus is therefore on creating the environment that will see the investment in the new assets and infrastructure be secured.

Business Support Initiatives

Cheshire & Warrington Growth Hub - The Cheshire & Warrington Growth Hub delivers business support to new and growing businesses by simplifying access to support, providing locally sourced solutions and making best use of the region’s business assets. The Growth Hub aims to provide impartial, clear and expert support to help businesses get the best support and advice. It provides and co-ordinates the wide range of business offers and funding opportunities by connecting local businesses with high quality support from local professional businesses, local & national government, and academia. The Growth Hub is governed by the Cheshire & Warrington LEP. www.candwgrowthhub.co.uk

Cheshire West & Chester Business Growth Team – Cheshire West and Chester Business Growth Service provides a confidential enquiry handling service that includes: council owned sites and premises suitable for start-up expansions and new investors; fast access to government funded business support service provided by qualified business advisors; introductions to supply chains and local networks; provision of training and supporting recruitment campaigns; advice on planning and regulatory service to facilitate investment and financial support on selected sites. www.finditincheshireandwarrington.co.uk

ECO Innovation – This project will deliver an intensive programme of flexible, SME-led innovation interventions. SMEs from across Cheshire and Warrington will gain access to University of Chester expertise, facilities and equipment, benefiting from researchers, academics and business support staff. SMEs from any sector are eligible, providing there is a low carbon focus to interventions. The project will work with SMEs to grow low carbon markets/new technologies, increase energy efficiency, increase SME capacity and capability for future R&D, decrease SMEs’ energy costs and greenhouse emissions, and increase adoption and commercialisation of new low-carbon technologies. www1.chester.ac.uk/business-growth/projects/eco-innovation

Enabling Initiatives

Heat Network Development - The Government’s Heat Network Delivery Unit (HNDU) combines grant funding with guidance from a team of commercial and technical specialists in developing heat networks. Cheshire West and Chester Borough Council have successfully secured a HNDU grant to undertake Energy Masterplanning and Feasibility studies for large scale industry focused heat networks in the borough.

The studies will involve the detailed investigation of technical design, financial modelling, business modelling, customer contractual arrangements and delivery approach up to the preparation of a business case for heat networks in the two areas which include Chester and the Industrial corridor of Ellesmere Port.

Energy Dynamics Mapping – A proposal to understand the energy usage within the Ellesmere Port industrial corridor; Understanding the profile of energy consumption across a daily / weekly / annual period as well as the scale of energy consumption will direct the deployment of energy cost-reduction solutions. The mapping exercise will include the heat data already gathered by the heat network project and also include electricity and gas production, distribution and consumption.

UK Geoenergy Observatories - is a £31 million capital infrastructure project commissioned by The Natural Environment Research Council (NERC), the UK’s main agency for funding environmental sciences, and delivered by the British Geological Survey (BGS), the UK’s leading research centre in geoscience.

This major project will provide infrastructure for future research opportunities with one site in Glasgow and another site in Cheshire.

The UK Geoenergy Observatories Project Science Plan was developed with world-class expertise and aims to establish new centres for research into the subsurface environment, research how natural processes can control resource availability and how natural resources can be used responsibly. The Project will generate an understanding of low-carbon energy technologies both in the UK and internationally.

The Project is NERC’s response to the government announcement in the 2014 Autumn Statement that it would create world-class subsurface energy research test centres. Funding for the £31 million UK Geoenergy Observatories project is provided to the Natural Environment Research Council by the Department for Business, Energy and Industrial Strategy and was confirmed in April this year (2017).

Electric Nation - The Electric Nation project is being hosted by Western Power Distribution. It is being delivered by a partnership of EA Technology, DriveElectric and Lucy Electric Gridkey. The project is funded via Ofgem through its Network Innovation Allowance scheme. The project aims to provide local electricity network operators with the tools to be able to ensure that their networks can cope with this massive new challenge, whilst avoiding replacing cables and substations. www.electricnation.org.uk
Skills

University of Chester – The University established the Faculty of Science and Engineering in 2014. Degrees in engineering and natural sciences are taught on site at Thornton Science Park using a strongly interdisciplinary teaching philosophy. They offer a range of courses in science, engineering, and mathematics. Forging strong links with industry, all the undergraduate degrees emphasise practical skills alongside theoretical knowledge to maximise the opportunities for graduates.

www.chester.ac.uk/science-engineering/

Cheshire Energy Hub Graduate Programme - The multi-employer development programme is aimed at graduates who are looking to develop experience in the power and energy sector. The programme extends over two years and involves 4 x six month placements in up to three well established Cheshire Energy Hub companies, giving each graduate access to different working environments and a range of organisations from SMEs to global entities.

www.cheshireenergyhub.co.uk

The Blueprint for Growth and Innovation

The District provides scale, short-term opportunities and the basis of a long term strategy. It provides an environment that nurtures innovation and collaboration, improves global competitiveness and will deliver a resilient energy system, sustainable growth and prosperity.

Mapping the energy system across the District identifies where activity is already taking place and where further innovation and growth is possible.

Key to the growth aspiration is the availability of development land connected to the energy system. The land provides the opportunity for sustainable growth – attracting new industry and further energy generation, together with the supporting supply chain.

In taking the District forward we see the development of five themes.
The Five Themes
Theme 1: Electricity

The overarching aim is to provide multi-generating assets supplying electricity directly to local industry through a District-wide micro grid with a connection to the national transmission system – balancing supply and demand.

£190m of new investment has been delivered in three assets in the last two years – 57MW wind farm, 21MW biomass plant and 20MW gas-fired STOR facility.

Direct supply through a securely supported microgrid has the real potential to provide cheaper electricity whilst achieving climate change objectives.

The outcome of a lower cost electricity supply base is support for existing business, especially SME’s, and the real opportunity to attract new investment to both grow existing business and to encourage new industry to locate within the District.

What can the Energy Innovation District offer?

The delivery of microgrid across the District will see private sector investment of £40m. The intention is to provide for the phased deployment, delivering the first phase to support new development and thus generate initial business rate growth.

Additional generation and storage assets may see the delivery of a further £600m investment.

The net result would see a microgrid that could both support the national grid and provide secure, low carbon and cheaper electricity to business and ultimately local communities.

What is our ask?

- The ability for the LEP to retain business rates from occupiers moving into the Energy Innovation District to enable the LEP to underwrite and de-risk up-front investment in micro-grid infrastructure - the investment case behind the microgrid would in the long-term be underpinned by commodity and user charges but assistance is required in leveraging the initial enabling investment.
- The provision of a regulatory system that supports the delivery of a District wide micro-grid distribution connected generation and energy storage

Theme 2: Heat

Heat represents nearly half of the UK’s energy consumption and currently gas provides around 80% of our heat at times of peak demand.

Gas is a flexible fuel that is already supplied to industry and households by well-established infrastructure. It is widely recognised that decarbonising the gas network is an important part of achieving low-carbon energy targets as well as ensuring households have affordable heat.

The District will adopt various initiatives to both provide lower carbon gas and efficient heat sharing networks.

What can the Energy Innovation District offer?

Developing hydrogen generation and bio-gas production are two key areas of activity.

A Hydrogen Hub has already become established within the District with UK wide membership and stakeholders – exploring fuel cell deployment (both static and automotive), local community trials around a decarbonised grid and the potential for Carbon Capture and Storage (CCS).

The investment necessary to deliver a hydrogen economy will be significant and to efficiently address feasibility it is important that the various initiatives across the UK work closely together and complement each other. We are aware and support the work of others across the country.

Key activity:

Downstream utilisation: the Energy Demonstrator at Thornton is already working with AFC Energy and Powerhouse Energy. Existing industry already produces hydrogen as part of processes which can be harnessed to enable the testing and proving of downstream technologies, i.e. fuel cells. These industrial trials compliment the more extensive HyDeploy programme at Keele and the Leeds 21 City Gate Project.

Upstream production: Powerhouse Energy is located within the Energy Demonstrator and is developing a distributed bio-hydrogen technology. The Hydrogen Hub partners are developing larger scale feasibility around steam methane reforming (SMR). Masterplanning around the Protos development makes provision for large scale SMR, connectivity within the District and to a wider Mersey Hub as well as the ability to deliver CCS. Bio-methane developments are also proposed within the development which, when commercially proven, have the ability to provide a distributed bio-methane/bio-SNG network.

Hydrogen storage: the development of hydrogen uses will necessitate the construction of hydrogen storages above ground or underground. A recent study commissioned by ETI (“The role of hydrogen storage in a clean responsive power system”) shows that the salt deposits in Cheshire are ideally suited and offers the most economic solution for large-scale hydrogen storage. Storengy is actively participating in various R&D programs in Europe that are aiming at demonstrating the feasibility of hydrogen storage.

Indeed, if SMR is to be the technology then effective CCS is clearly necessary – we believe the area presents commercially deliverable opportunity in the southern Irish Sea (“The East Irish Sea CCS Cluster – A Conceptual Design [Eunomia 2011]”).
Within the District the key parts of a low-carbon gas network already exist and, whilst the level of planned investment is difficult to appraise, there is a clear appetite amongst industry to innovate and develop. Key short term deliverables are:
- Fuel cell and bio-methane trials at the Energy Centre
- Commercial scale bio-methane facility within Protos
- £150m committed investment by Storengy UK in gas storage
- Continued work of the Hydrogen Hub to masterplan a low carbon gas network and CCS
- Indigenous methane resources

The second limb of the District’s heat aspirations is the delivery of large scale heating networks to support activity and local communities. Cheshire West and Chester Council, working with the Government’s Heat Network Delivery Unit and industry partners, has secured funding to further assess the feasibility of local heat networks – potentially linking to local industry supplies.

Within the District we would commit to exploring the potential for heat supply networks alongside other utility supplies to move forward the overarching aim of providing total lower cost energy.

**What is our ask?**
- The ability for the LEP to retain business rates from occupiers moving into the Energy Innovation District to enable the LEP to underwrite and de-risk up-front investment in gas infrastructure - the investment case would in the long-term be underpinned by commodity and user charges but assistance is required in leveraging the initial enabling investment.
- Extend enhanced capital allowance benefits to underground gas storage companies and a review of the approach to determining the rateable value of underground storage assets
- Review Energy Intensive Industry benefits to provide short term support for companies as the Energy Innovation District becomes established
- The provision of a regulatory system that supports hydrogen and bio-methane injection to the grid and the support of hydrogen trials and pilot hydrogen storage
- A review of Carbon Capture and Storage feasibility in the Southern Irish Sea
- BEIS Heat Network Delivery Unit to widen their heat focussed remit to incorporate power in order to provide a total energy dynamics solution
- Continued support for trials around hydrogen injection in to the national grid and R&D or pilot projects for hydrogen storage.

**Theme 3: Automotive**
Recognising the need to strive for a zero emission automotive sector by 2050 the transportation element of the District is a fundamental consideration – both in providing non-road opportunities, particularly for freight, and in delivering zero carbon fuels.

**What can the Energy Innovation District offer?**
There has already been significant research in to the impact of electric vehicles on the low voltage network through the ‘MyElectricAvenue’ and ‘Electric Nation’ projects, through mass consumer trials on real electricity networks to support smart charging and the use of demand control to support electric vehicle uptake.

In parallel, there is work being undertaken on fuel cell applications within the automotive sector, particularly with regard to heavy goods vehicles. Indeed, the distributed hydrogen application from Powerhouse Energy, see above, is being targeted as an automotive application.

An extended re-fuelling trial/commercial infrastructure will be delivered within the District – this will encompass both cars, HGV’s and potentially shipping and will consider multi – fuels. EA Technology is at the forefront of electric vehicle technology and is committed to developing the commercial case for the accelerated adoption of such technology.

In addition to delivering commercial scale low carbon energy technology, Protos will also invest in removing freight off roads by the investment of £11m in new rail and berth infrastructure.

**What is our ask?**
- That Government provides a clear policy and regulatory framework in which technology innovation and trials can be developed.
- That Innovate UK engage specifically in a project to determine the potential role of electric vehicles within a significant micro grid to provide local balancing services
Theme 4: Innovation

Innovation is a key driver for the Energy Innovation District in order to develop and embed new energy generation and systems, attract and retain high value skills and expertise in the region and ensure sustainable economic growth.

The District already benefits from two key research and innovation facilities: the University of Chester’s Thornton Science Park and URENCO’s Sustainable Energy Technology Park: Capenhurst, but we need to build on our existing research and innovation assets to create a comprehensive energy innovation-eco-system that will not only drive innovation in the Energy Innovation District but can become a world class centre for energy systems research.

As such, the Cheshire and Warrington LEP’s proposals for the establishment of an Institute of Technology covering the energy, nuclear and pharmaceutical sectors is entirely complimentary.

What can the Energy Innovation District offer?

With two leading centres of innovation in the energy centre, the Energy Innovation District offers access to academic and commercial research and expertise, state-of-the-art research facilities and equipment and graduate talent through an established graduate programme. However, the real advantage of the Energy Innovation District will be access to the first industrial at-scale district-wide energy demonstrator in the UK for academic and commercial researchers across the UK to develop and test new technologies and approaches.

URENCO and EA Technology commit to enable the Sustainable Energy Technology Park to deliver heat and power through new energy technologies. This will represent a path finder for other commercial properties, with a full set of guidelines being delivered on how other businesses can make the transition.

The University of Chester has committed £40m investment in to the Thornton Science Park and is working with organisations on projects that will secure a further approximately £120m of inward investment.

What is our ask?

- The identification of the Energy Innovation District as a strategic area for the deployment of funding support for energy innovation – potentially for Innovate UK and SBRI to identify ring-fenced funding for R&D and demonstrator support
- That support is provided for the proposals being developed by the Cheshire and Warrington LEP for the establishment of an Institute of Technology covering the energy, nuclear and pharmaceutical sectors.

Theme 5: Development of energy intensive manufacturing and the associated supply chain

The fundamental objective of the District is to create an environment that delivers growth and inward investment. Providing cheaper energy is an element of delivering that growth but providing well connected and supported development land is also key to securing growth and investment.

What can the Energy Innovation District offer?

The offering here is very simple – the District contains over 480 hectares (1,200 acres) of development land for the growth of existing business or for the inward investment of new business. What the District will do to encourage investment is the output from the themes above:

- Lower cost energy — in all its forms
- Access to a skilled workforce
- Access to innovation — the Cheshire Energy Hub being committed to coordinating activity within the sector, sharing knowledge and encouraging, with partners, investment in the District
- Access to the knowledge base at the University of Chester's Thornton Science Park
- A coordinated approach from incumbent industry and business seeking to locate within the District will target supply chain opportunities, especially where this brings supply chain activity from overseas

What is our ask?

- That the Energy Innovation District benefits from an extension of the Cheshire Science Corridor Enterprise Zone in relation to energy companies.
- Discounted Business Rates of £55,000 per annum up to a total of £275,000 over 5-years for energy supply chain companies locating in the Energy Innovation District
- Enhanced capital allowances are extended to energy generators or supply chain companies investing in the Energy Innovation District
- Business Rates arising from development in the Energy Innovation District are retained by the LEP and reinvested in energy related infrastructure
- Relaxed planning & regulatory controls

The Cheshire Energy Hub will support the Institute of Technology in the provision of multi-level technical education across the entire energy science sector, promoting the availability of employer-backed training solutions, supporting new entrants into the sector, particularly through apprenticeships, and boosting skills transferability.
Energy Innovation District

What does an Energy Innovation District need?

An Energy Innovation District is similar to an Enterprise Zone and provides for:

- A greater geographical area than would typically be included within an Enterprise Zone given the scale and nature of the energy infrastructure required but with incentives targeted at businesses that are either energy businesses, energy intensive or are part of the supply chain
- Guaranteed lower energy costs within the Energy Innovation District
- Enhanced Capital Allowances for large-scale energy and infrastructure investments and underground gas storage facilities
- Business rate discounts to stimulate the SME supply chain
- Retained business rates from occupiers moving into the Energy Innovation District to enable the LEP to underwrite and de-risk up-front investment in energy infrastructure
- Incentivise the skills system to provide high skilled labour and specialisms to improve productivity
- Seed funding to create a dedicated and targeted business support programme tailored to the needs of the sector and to provide specific support in relation to supply chain development within SMEs, for example a dedicated innovation fund to invest in smaller companies would increase the attractiveness and competitiveness of the area
- Flexibility to broaden scope within existing (Government) incentives/ funding schemes to enhance and maximise local opportunities
- Essential infrastructure in place – road, rail, water and aviation – connecting the District to the UK and worldwide

The outcome:
We believe that the formal designation of an Energy Innovation District and the package of support would deliver in the region of:

- The creation of an exemplar business district with UK wide application and of international significance
- Over £7bn private sector capital investment
- Around £2.3bn gross value added per year
- Over 33,700 new full time equivalent jobs
- 480 hectares of land developed

To make this happen we are asking for:

- The Energy Innovation District to benefit from an extension of the Cheshire Science Corridor Enterprise Zone in relation to energy companies
- The ability for the LEP to retain business rates from occupiers moving into the Energy Innovation District to enable the LEP to underwrite and de-risk up-front investment in micro-grid and gas infrastructure
- Enhanced capital allowance benefits to underground gas storage companies and a review of the approach to determining the rateable value of underground storage assets
- The provision of a regulatory system that supports a District wide micro-grid, distribution connected generation and energy storage, hydrogen and bio-methane injection to the grid and the support of hydrogen trials and pilot hydrogen storage
- A review of Energy Intensive Industry benefits to provide short term support for companies as the Energy Innovation District becomes established
- A review of Carbon Capture and Storage feasibility in the Southern Irish Sea
- BEIS Heat Network Delivery Unit to widen their heat focussed remit to incorporate power in order to provide a total energy dynamics solution
- Government to provide a clear policy and regulatory framework in which technology innovation and trials can be developed in the automotive sector
- Innovate UK to engage specifically in a project to determine the potential role of electric vehicles within a significant micro grid to provide local balancing services
- The identification of the Energy Innovation District as a strategic area for the deployment of funding support for energy innovation

The outcome:
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