Manchester is a world-class City Region committed to action on Climate Change; presenting businesses with significant market opportunities in the low carbon industries particularly in smart grids.

Greater Manchester has the long-term environmental vision to be carbon neutral by 2038. With its own Metro Mayor and additional powers devolved from central government, Greater Manchester is well positioned to implement large infrastructure projects.

Greater Manchester’s Climate Change & Low Emissions Strategies Implementation Plan has, as one of its priorities, the acceleration of the delivery of an investment pipeline of c£200m low carbon energy generation and efficiency projects including smart grids and district heat networks.

Manchester is the UK’s fastest growing city. By 2035 there will be a forecasted 233,000 new homes and 6.6 million m² of commercial and industrial floorspace. This forecasted growth will create considerably more demand for energy and is creating the ideal conditions for investment in smart grid infrastructure.

The city is internationally recognised as a leader in smart grid research and demonstration. World-class research facilities, a growing supply chain and an environment that fosters industry collaboration has helped to position Manchester at the forefront of smart grid development.

Manchester is home to Electricity North West (ENW), one of the UK’s most forward thinking and innovative Distribution Network Operators. With a recent investment from Kansai Electric Power Co of Japan which demonstrates international interest and opportunities in the energy sector in Greater Manchester, ENW is investing £1.9bn in the regional network by 2023. There is a growing base of power generation and smart grid supply chain companies locally. Siemens has its Transmission & Distribution UK HQ as well as RXPE and Canadian owned engineering firm WSP. In addition, there is a significant digital sector with smart grid expertise, with global leaders such as IBM, Cisco and Landis + Gyr.

Manchester is committed to be carbon neutral by 2038.

WSP ranks Manchester 8th in its Global Cities Index for Power Generation & Distribution (2018)

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SMART GRIDS - THE UK OPPORTUNITY

The UK’s regulatory environment, market opportunity and support for R&D and innovation, positions the UK as a European leader for smart grid investment.

The UK is now recognised as a European leader in smart grids. This is creating significant market opportunities for businesses with innovative products and services including: grid optimisation and automation systems, data management software, demand response, control systems and cyber security.

The UK has legally binding targets to reduce carbon emissions by 80% by 2050. The UK represents a significant market opportunity for smart grid related businesses. Over £24.5bn is to be invested in the national power networks between 2015-2023 (RIIO-ED1).

Smart meters, a vital component in the smart grid, are being rolled out across the UK. The National Smart Grid programme is installing 53 million smart meters to all homes and small businesses. The significant projected increase in the adoption of electric vehicles in the UK is impacting on electricity demand and the country’s energy distribution systems.

In November 2018, the Secretary of State for the Department of Business, Energy and Industrial Strategy announced reviews on the regulation of network infrastructure. These are intended to remove regulatory barriers to smarter and distributed grids.

Support for R&D and Innovation

The UK has introduced a range of supportive programmes to drive innovation of smart technologies in smart grids. For example, Ofgem has introduced an annual Electricity Network Innovation Competition with up to £70m of funding per annum provided to the best smart grid innovation projects.

The Government has committed to increasing investment in R&D by £4.7 billion over the next four years. The government’s Industrial Strategy, supported by the Industrial Strategy Challenge Fund has a focus on ‘Clean Growth’, batteries for energy storage, materials of the future; robotics and artificial intelligence.

A considerable supply chain opportunity

The implementation of smart grids in the UK is creating considerable supply chain opportunities. This includes: transmission, low voltage, controls, switchgear; sensors, intelligent computer power; data and communication.

There are also considerable business opportunities presented in digital technologies needed to help redefine the power network. The large influx of consumer and network data will require capabilities in big data, Internet of Things and cyber security.

Energy storage and energy conversion technology suppliers are integral to the smart grid. The latter includes the transformation of electricity into a storage format for later use in balanced energy supply and demand including carbon capture and storage. Storage technology supply chain requirements include, amongst others, EV batteries.

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MANCHESTER: A LOCATION FOR TRIALLING SMART GRID TECHNOLOGIES

Greater Manchester provides a collaborative environment for private and public sector collaborations in smart grid demonstration projects.

Greater Manchester provides a nationally significant testing environment for energy demonstrator projects including in smart grids. In the last five years alone, Electricity North West (ENW) has won £42m of competitive funding to invest in new technologies for smart power grids.

The following are a small selection of projects that demonstrate the scale and types of energy demonstrator projects locally:

**Smart Street**
A £11.5m project with ENW with partners including Siemens, Kelvatek and the University of Manchester. This demonstrator used intelligent software for trialling new innovative techniques to stabilise voltage.

**CLASS – Customer Load Active System Services**
Another ENW demonstrator, this £9m Ofgem innovation funded project successfully demonstrated a low-cost solution using cutting edge voltage control to manage electricity consumption at peak times.

**City Verve**
This Smart City project considered all possible uses of digitally enabled neighbourhoods, including energy usage. Project partners included CISCO, BT, and Siemens, working alongside Manchester Science Partnership and the University of Manchester. The project enabled remote monitoring of building occupancy and of heating and power consuming appliances, so that the buildings can participate in a smart grid and trade in the Balancing Services and Capacity Market.
A WELL ESTABLISHED AND GROWING SMART GRID INDUSTRY

The breadth and depth of the power generation and smart grid industry locally positions Manchester as an ideal location for companies fostering industry collaborations to serve local, national and international market opportunities.

The smart grid industry is represented by energy storage and energy conversion solution providers to communication networks, big data analytics and consulting engineering. Companies include Siemens Transmission & Distribution, CISCO, IBM, ARUP, RXPE, Landis+Gyr, AECOM, Northrup Gruman and Moixa.

<table>
<thead>
<tr>
<th>Selected Companies</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco</td>
<td>Solutions and networking platforms providing key security and data analytics capabilities for the energy sector including smart grids.</td>
</tr>
<tr>
<td>CGI</td>
<td>CGI provides technology and software solutions to the electricity utility markets.</td>
</tr>
<tr>
<td>IBM</td>
<td>Systems software development laboratory for developing and test optimisation, security and virtualisation software to manage and analyse real-time data including for smart grids and data centres.</td>
</tr>
<tr>
<td>Netcontrol</td>
<td>Development of network automation products and SCADA systems for power control centres</td>
</tr>
<tr>
<td>RXPE</td>
<td>Developer and supplier of HV power electronic solutions. HQ with engineering &amp; project management</td>
</tr>
<tr>
<td>S&amp;C Electric Company</td>
<td>US owned, the Europe Power Systems Services operation provides consulting services on renewable energy and grid automation, system design, build, and installation consultation.</td>
</tr>
<tr>
<td>Siemens Low Voltage Division</td>
<td>UK HQ and manufacture of switchgear and electrical controls</td>
</tr>
<tr>
<td>Siemens Transmission &amp; Distribution</td>
<td>UK HQ of T&amp;D Division. Design, project engineering, project management and technical support in delivering grid and substation projects. The centre is home to Siemens’ European Centre of Competence for offshore grid connection.</td>
</tr>
<tr>
<td>Stream Measurement</td>
<td>Manufacturer specialising in specific aspects of meter production, distribution and flow meter calibration.</td>
</tr>
<tr>
<td>TNEI Services</td>
<td>T&amp;D power systems analysis, design and planning as well as power systems analysis software.</td>
</tr>
<tr>
<td>WSP</td>
<td>Canadian engineering consultancy. UK HQ and EMEA Power Networks and Smart Grid team is based in Manchester.</td>
</tr>
</tbody>
</table>

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CASE STUDY: CISCO

Overview
Cisco is a worldwide leader in IT solutions and services covering networking, mobility, security, collaboration and the Internet of Things - transforming how people connect, communicate and collaborate. Cisco networking platforms include key security and data analytics capabilities which are highly relevant to enabling smart grids in their widest sense. This includes the use of smart grids for analysis of real-time data and energy usage across multiple industries.

Cisco’s Manchester operation
Cisco’s main location in the North of England is Manchester. The company has also opened its new innovation centre “Mi-IDEA” in partnership with Manchester Science Partnerships, located in Manchester Science Park. This centre provides office space, collaboration equipment, one to one support, mentoring and go-to market strategies for disruptive technology companies.

Cisco has been working with Innovate UK, Manchester City Council and a number of other partners in developing the UK’s Smart City demonstrator “CityVerve” in Manchester. This project included the University of Manchester and Manchester Metropolitan University, Cisco and Siemens.

Cisco is pioneering the use of Internet of Things (IoT) technologies to redefine ‘smart’ in the context of a living, working city. Projects include a next generation building management system incorporating energy storage and demand management.

“Cisco is committed to driving digitisation at a national level for the benefit of the economy and citizens. As part of Cisco UK’s Country Digital Acceleration programme Cisco has invested in Manchester to show how digitisation can deliver public and private outcomes faster and more effectively. Specifically Cisco is a leading technology partner in Manchester’s “CityVerve” smart city demonstrator. We have also opened Mi-IDEA, an innovation centre at the heart of Manchester’s innovation district and in partnership with MSP. Mi-IDEA provides collaboration opportunities for local start up and scale up organisations to help address challenges facing countries, businesses and industries.”

- Chris Reeves, Country Digitisation Director, EMEAR
**CASE STUDY: SIEMENS AG**

**Overview**
Siemens is a global technology powerhouse with 379,000 employees worldwide. Siemens UK headquarters is in Manchester where it employs over 1000 people, home to specialisms including automation, digitisation and the UK’s largest group of HV power systems design engineers.

**Siemens in smart grid**
Three of Siemens’ biggest markets are power, manufacturing & life sciences where its focus on the areas of electrification, automation and digitalisation have multiple applications. It is a leading supplier of efficient power generation and power transmission solutions, a pioneer in infrastructure solutions as well as a global leader in automation, drives and software solutions for industry.

**Renewables Energy Engineering Centre, Manchester**
Siemens Energy Transmission has built a new state-of-the-art Renewable Energy Engineering Centre in Manchester which houses the Global Centre of Competence for High Voltage Grid Connections (HVDC). This is the only high voltage lab in the UK and is hosted in partnership with University of Manchester. Its main focus is the design and build of HVDC transmission systems for the UK and North West Europe and its services are a core element in many offshore wind farm developments.

“Siemens UK has been based in Manchester for over 30 years. We like it here – not just because it is conveniently placed for business travel within the UK and worldwide. We have found the City to have a welcoming and supportive approach to overseas investors, a strong and collaborative academic research base with a focus on energy and digital topics that matches our business and a logical and progressive approach to planning a low carbon future for the City which we thoroughly endorse.”

- Juergen Maier, Chief Executive, Siemens UK
LEADING R&D UNIVERSITY EXPERTISE

Greater Manchester is home to four universities - the University of Manchester, the University of Salford, Manchester Metropolitan University (MMU) and Bolton University.

At the forefront of energy research, Greater Manchester is an innovation test bed with over twenty world-leading energy research groups, state-of-the-art science parks and dedicated “living labs” providing businesses with controlled and real-world environments to test and trial new low carbon innovations.

University of Manchester

School of Electrical and Electronic Engineering

The School of EEE, one of the largest schools of its kind in the UK has world class research expertise in power systems protection, control and communications. The University hosts the UK’s largest HV (High Voltage) laboratory, the National Grid Power Systems Research Centre.

Areas of expertise include:
- Control systems
- Digital signal processing
- Electrical materials
- Electronic devices
- High voltage technology
- Energy networks
- Power conversion & power electronics
- Sensors & sensing systems
- Systems integration
The Photon Science Institute
The initial development phase 1 of this Institute represents a £50 million investment in world-class research infrastructure. This includes more than £20 million of high-spec laser, spectroscopy and imaging equipment.

Big Data and AI
The University of Manchester has major strengths in Big Data, AI and novel computer architectures. The Data Science Institute brings together over 250 researchers in Big Data from across the University. The University is a lead partner in the N8 High Performance Computing Centre across the wider North of England.

Advanced Materials
The School of Materials is ranked 1st in the UK for research and is home to the Henry Royce Institute, the UK’s Hub for Advanced Materials Research. Manchester has world class expertise in advanced materials, with capabilities in areas including: graphene/2D materials; composites; surfaces and coatings; light alloys; and materials for demanding environments.

Graphene is a strong and flexible world-changing 2D material that conducts electricity as efficiently as copper and has multiple applications in energy storage and as supercapacitors.

The National Grid Power Systems Research Centre
This centre is capable of testing equipment designed for use on the 400 kV power system.

The Rolls-Royce University Technical Centre
LEADING R&D UNIVERSITY EXPERTISE

University of Salford

The Built Environment
The University of Salford’s Centre for Built Environment Sustainability and Transformation is addressing complex socio-technical problems around informatics, innovation and energy consumption in the built environment.

The University’s Energy House - rebuilt inside a climate-controlled test chamber - is a leading test bed for commercialisation of energy solutions for residential properties.

Energy House 2.0 is a newly established £16 million home energy research centre. It offers state-of-the-art testing for companies innovating in the construction, energy, smart homes and digital sectors.

Computer Networking & Telecommunications Research Group
The group undertakes both pure and applied research in the field of telecommunications and computer networking including: wireless systems, networked multimedia applications, quality of service, mobile networking, intelligent buildings, context driven information systems and communication protocols.

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Smart grid researchers from the School of Engineering have been working with industry to develop ‘Internet of Things’ technology that automatically alters electrical usage - such as in lights - depending on a room’s data. In addition, research is being undertaken on the development and control of ‘smart grids’ for better integration of solar and wind turbine power into the national grid.

Greater Manchester’s supportive academic ecosystem complements the local government’s policy & strategy. Low carbon is a key priority in Manchester: committed to carbon neutrality by 2038 & implementing a 5-year environment plan, with scale and a supporting infrastructure to enable roll out of smart cities / low carbon infrastructure / de-carbonisation of heat and transport solutions.

To foster innovation and rapid commercialisation Greater Manchester Combined Authority is establishing an ‘Energy Transition Region’ providing a large scale test environment to accelerate innovation, decarbonisation and growth across all areas of the energy system, from generation through to the end consumer.
Manchester airport flies direct to over 200 destinations worldwide. Its three terminals handle over 27 million passengers and 121,000 tonnes of import and export freight annually. Manchester Airport is the global gateway to the North of England, and the largest UK airport outside of London. The airport and its World Freight terminal are located directly next to the motorway network.

Manchester Piccadilly is one of three main stations in Manchester city centre and offers direct services to other major UK cities. There are 60 direct trains a day to London (three an hour) in 2h08min. The High Speed 2 (HS2) project will reduce travel time to London to roughly 1h18min.

Manchester’s central location and extensive motorway network ensures easy access to the rest of the UK. There is also significant investment to upgrade the motorway network around Manchester to a smart motorway to optimise traffic flow.

Manchester is directly linked to the West Coast Main Line which is the most important freight route in the UK. About 40 freight trains enter Manchester every day. This is expected to increase to 60 per day by 2030.

The Manchester Ship Canal connects Manchester to international shipping and container routes to North America, Europe and the Far East through the Port of Liverpool. This port includes a deep water container terminal – Liverpool2. More than 40 million tonnes of freight are handled a year through the port (about 8% of the total UK container market).

Manchester’s multi modal network ensures consumers can access and meet all their logistics needs with ease.
Manchester’s central UK location enables smart grid related supply chain companies to efficiently access the majority of the UK’s DNOs headquarters from a Greater Manchester location.

<table>
<thead>
<tr>
<th>Selected DNO Head Offices – Distances from Manchester City Centre</th>
<th>Drive Time</th>
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<tbody>
<tr>
<td>Electricity North West</td>
<td>30 minutes</td>
</tr>
<tr>
<td>SP Energy Networks</td>
<td>40 minutes</td>
</tr>
<tr>
<td>Northern Powergrid</td>
<td>2 hrs 30 mins</td>
</tr>
<tr>
<td>Western Power Distribution</td>
<td>3 hrs 20 mins</td>
</tr>
<tr>
<td>UK Power Networks</td>
<td>4 hours</td>
</tr>
<tr>
<td>Scottish and Southern Electricity Networks</td>
<td>4 hrs 30 mins</td>
</tr>
</tbody>
</table>

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LOCATE YOUR FIRM IN A DYNAMIC AND LIVEABLE CITY

Manchester is a vibrant and cosmopolitan city, named the most liveable city in the UK in The Economist’s “Global Liveability Index 2019”. This high quality of life attracts many students to stay in the city after graduating and allows companies to attract and retain talent.

**Culture**
From music and art to theatre and architecture, Manchester’s culture is known for its energy and excellence. Festivals are common place in the city including the Manchester International Festival, Manchester Jazz Festival and Food and Drink Festival.

**Dining**
From high-end restaurants and renowned chefs setting up camp here, to independent good value eateries, global cuisine and also local produce on offer, Manchester has cemented itself as a culinary city.

**Shopping**
Manchester is the shopping capital of the North, offering a diverse shopping experience. From high street names to high-end designer brands to quirky independent stores, there are shops to satisfy all tastes.

**Heritage**
Birthplace of the computer, the football league and public libraries Manchester’s heritage is rich and diverse. Alongside museums, stately homes are situated close to the city centre.

**Countryside**
Manchester has miles of inspiring countryside, with the world-renowned Lake District one of 4 national parks within 1 hour of the city. Crisscrossed by historical waterways and dotted with picturesque towns, there’s many fascinating attractions that make for a great day out of the hustle and bustle of the city.

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Manchester is a city committed to supporting new investors and helping existing companies grow.

MIDAS, Manchester’s inward investment agency, can signpost businesses towards all the relevant initiatives and provide guidance on funding, to enable growth and develop new products.

MIDAS can help you and your business with relocation and expansion plans. MIDAS has a reputation for understanding diverse business needs and helping to remove any barriers for companies looking to locate or expand into Manchester.

MIDAS’ specialist business development team can assist you with a range of free, bespoke packages of confidential support that will make your journey as smooth and simple as possible.

The services provided by MIDAS are also available to intermediaries such as location consultants.

**Free Support available:**

1. Research support and business case development
2. Introductions to local networks
3. Recruitment and training support and advice
4. Property solutions including advice on enterprise zones and accelerators
5. Relocation advice and assistance
6. Advice on how to access funding for R&D and Innovation

“MIDAS were very supportive with connecting us to Universities, Government-led schemes and the talent pool in Manchester. They have been one of the very big reasons why we decided to invest.”

- Sreeram Venkateswaran, CEO at Hero Global Designs

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