



GREATER LINCOLNSHIRE LEP VIRTUAL ENERGY COUNCIL 26TH JUNE 2020

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Paper 0 - Greater Lincolnshire LEP Energy Council Agenda

Time	Item	Lead	Status
10.00	Welcome, Apologies, Declarations of Interest	Duncan Botting	
10.40	Discussion Topic 1 - See below	Duncan Botting & Council Members	
11.10	Discussion Topic 2 - See below	Duncan Botting & Council Members	
11.40	Discussion Topic 3 - See below	Duncan Botting & Council Members	
12.10	Next Stage Action Planning	Duncan Botting & Council Members	
12.25	Any Other Business	Council Members	
12.30	Close of meeting		

Attendees: Duncan Botting (Chair), John Henry Looney, Jacqui Bunce, Arnold Craven, Cllr Barry Dobson, Simon Green, Marie Harley, Martin Haworth, Mark Hutchinson, Lea James, Jeurgen Schpaer, Justin Brown, Jack Hayhoe, Katya Bozukova

Apologies: Emma Bridge. Ruth Carver

Officers: Andrew Brooks

Summary

The digital transformation of energy has the potential to rapidly transform the UK energy system. Bringing innovative companies together to identify gaps in the market and synergies in their offerings, and to deliver the integrated solutions, will benefit consumers in the future.

The UK energy system is going through increasing decentralisation and decarbonisation processes. In this context digitalisation and access to data are key enablers, as they unlock opportunities for actors across the value chain (i.e., consumers, prosumers, aggregators, mobility service providers, energy communities), providing them with new opportunities.

Making energy data discoverable, searchable and understandable by third parties, and usable, is a huge challenge. The maximum value of data can only be realised when potential users are able to discover it, search for related datasets and understand the content of data. Net Zero is going to need lots more intermittent generation and more flexibility, and that will require good data sharing.

The fast-growing digital energy sector has businesses spanning digital platforms, services and physical assets across residential, commercial, industrial and grid markets. Identifying opportunities and gaps for innovators to capitalise on as the energy sector transforms, will be vital in the coming years, and for delivering on the net zero ambitions by 2050.

Discussion Topics

Discussion Topic 1

There is plenty of change happening in the energy industry, ranging from an increase in production from renewable sources to changes in how we consume energy, for instance the electrification of transport. We also have the nationwide rollout of smart meters which will eventually enable more ways for people to be more engaged with their energy consumption, and consumers are also becoming attracted to using new smart energy infrastructure such as thermostats, lightning or micro generation.

Questions for discussion

1. Where will the appetite come from, and how much is known about this sector locally to capitalise on this?
2. What are the opportunities for Greater Lincolnshire to engage in this change, particularly from a digital or data perspective? What is missing/needed/useful and what can we as a group do to rectify this? Does current national guidance provide the necessary trusted model for business to invest??
3. As a stakeholder group embedded in this topic which of our private networks can we leverage to help develop a crowd sourced approach to resolving the challenges identified above?

Discussion Topic 2

Alongside all the above, there are developments in areas that many people would not immediately associate with the energy sector. Personal devices, home appliances and even our vehicles are now becoming connected to the internet. Developments in machine learning and artificial intelligence are enabling us to process information faster, and with better accuracy and sensitivity to context.

With the introduction of faster and automated switching of energy supplier, price comparison websites could move from a model of providing advice to consumers to taking full control. In this scenario a price comparison company might assess consumption patterns and energy supplier offerings to find the best deal on a regular basis, and then take a share of the price savings made.

We are likely to start to see energy contracts bundled with other products as a Utilities as a Service offering - where companies will monitor home energy efficiency and balance energy costs by installing new white goods or household insulation.

Questions for discussion

1. Do we have the right type 'digital' sector base to support this type of energy transformation - if not what is missing and what can we as a group do about this?
2. How would we be able in Greater Lincolnshire to utilise data in this fashion, to support both business delivery, and consumer demand - business led examples or already identified consumer needs would be helpful as case studies?
3. What type of Greater Lincolnshire focussed sectoral support programmes, and skills training would be needed to underpin this type of shift in consumer control for business to properly engage?

Discussion Topic 3

It is now possible to measure and monitor machine behaviour at such a granular level that we can identify invisible flexibility in the way we consume power, enabling our demand for energy to interact intelligently with supply and in turn pave the way for a system powered entirely by renewable energy.

Artificial intelligence enables us to orchestrate this demand flexibility at scale - coordinating industrial processes, local generation, battery storage and electric vehicle charging—to give rise to an autonomous, self-balancing grid which operates incredibly cheaply.

By automating and optimising distributed energy resources in real-time, we can create an affordable, zero carbon energy future. It's also difficult to talk about radical changes in business models without mentioning Blockchain, and distributed ledger technologies.

Blockchain is the first technology that offers a way to fully manage digital assets in a trusted, traceable, automated and predictable way. What distinguishes blockchain is that each 'block' is linked and secured using cryptography. Trust is distributed along the chain, eliminating the need for a trusted third party to facilitate digital relationships.

These technologies will decentralise energy trading and enable prosumers (consumers who generate their own power through microgeneration) to trade electricity directly with their neighbours.

Questions for discussion

1. In what way would the energy infrastructure have to change to accommodate these future trends, in Greater Lincolnshire?
2. What role do you envisage SMARTgrid technology and local energy markets will play in this energy transformation?
3. What importance will the driver of net zero have on the development of business and development in Greater Lincolnshire, to support the input of investment and skills needed to achieve 2050 ambitions, through digital and data means?

Background

The Digital Energy Challenge and Opportunity

The fast-growing energy sector has businesses spanning digital and data platforms, services and physical assets across residential, commercial, industrial and grid markets. Digitalisation is already beginning to improve the performance of existing assets and infrastructure, whilst services are emerging (driven by data) which may unlock value across the whole system.

The main aim of the LEP Energy Council is to identify opportunities and gaps for innovators to capitalise on in the Greater Lincolnshire area, as the energy sector transforms in the coming years.

As a result we need clear visibility of the companies that are innovating in this space and the types of innovations that are emerging, so policy-makers, regulators, investors, and indeed innovators themselves, can remove barriers to energy system integration, and drive the scale-up that will enable Greater Lincolnshire ultimately to take a lead in energy system transformation.

Digitalisation a vital enabler of Net Zero

The Energy Data Taskforce, commissioned by Government, Ofgem, and Innovate UK, has set out five key recommendations that will modernise the UK energy system and drive it towards a Net Zero carbon future through an integrated data and digital strategy throughout the sector.

The recommendations highlight that today a 'Modern, Digitalised Energy System' is being hindered by often poor quality, inaccurate, or missing data, while valuable data is often restricted or hard to find.

The Taskforce run by Energy Systems Catapult and chaired by Laura Sandys, has delivered a strategy centred around two key principles:

- Filling in the data gaps through requiring new and better-quality data, and
- Maximising its value by embedding the presumption that data is open

These two principles will start to unlock the opportunities of a modern, decarbonised and decentralised Energy System for the benefit of consumers.

The Energy Data Taskforce has developed five recommendations within their report: A Strategy for a Modern Digitalised Energy System (summarised here):

- **Recommendation 1: Digitalisation of the Energy System** - Government and Ofgem should use existing legislative and regulatory measures to direct the sector to adopt the principle of Digitalisation of the Energy System in the consumers' interest.
- **Recommendation 2: Maximising the Value of Data** - Government and Ofgem should direct the sector to adopt the principle that Energy System Data should be Presumed Open, supported by requirements that data is 'Discoverable, Searchable, Understandable', with common 'Structures, Interfaces and Standards' and is 'Secure and Resilient'.
- **Recommendation 3: Visibility of Data** - A Data Catalogue should be established to provide visibility through standardised metadata of Energy System Datasets across Government, the regulator and industry.
- **Recommendation 4: Coordination of Asset Registration** - An Asset Registration Strategy should be established in order to increase registration compliance, improve the reliability of data and improve the efficiency of data collection.
- **Recommendation 5: Visibility of Infrastructure and Assets** - A unified Digital System Map of the Energy System should be established to increase visibility of the Energy System infrastructure and assets, enable optimisation of investment and inform the creation of new markets.

The Taskforce identified a staged approach should be taken towards achieving a Modern, Digitalised Energy System:

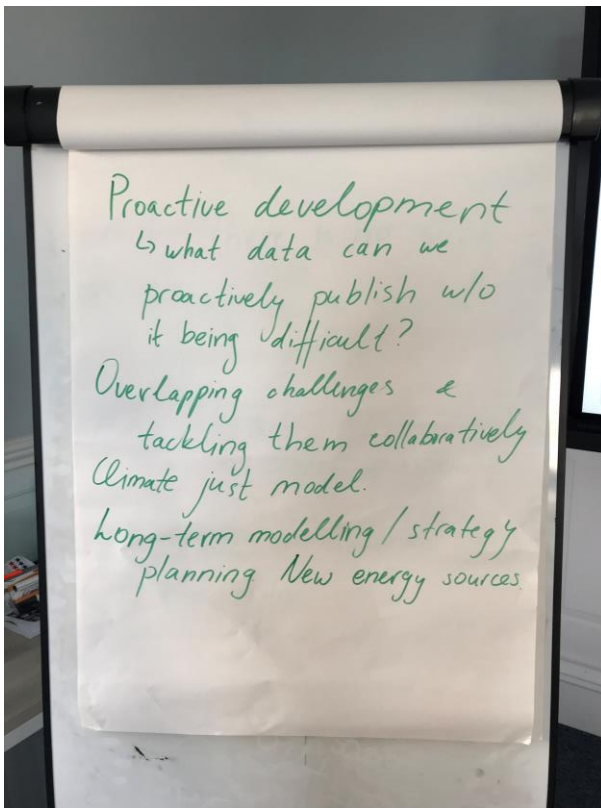
- **Data Visibility:** Understanding the data that exists, the data that is missing, which datasets are important, and making it easier to access and understand data.
- **Infrastructure and Asset Visibility:** Revealing system assets and infrastructure, where they are located and their capabilities, to inform system planning and management.
- **Operational Optimisation:** Enabling operational data to be layered across the assets to support system optimisation and facilitating multiple actors to participate at all levels across the system.
- **Open Markets:** Achieving much better price discovery, through unlocking new markets, informed by time, location and service value data.
- **Agile Regulation:** Enabling regulators to adopt a much more agile and risk reflective approach to regulation of the sector, by giving them access to more and better data.

The main issue around data collection will be gaining the trust of operators, which wouldn't normally share data because of commercial confidentiality concerns. This also has to make sure that where data taken from individual, that it is secure, given the potentially identifying nature of the information. Lastly, it needs to maximise the impact of the data it could make open by ensuring others could have confidence in it, and therefore use it.

Creating trust through transparency

Any open data mechanism will need to work very hard to ensure measures are taken so operators/stakeholders can participate without fear of giving away anything personal or sensitive. It will also have to create very transparent processes, to make sure that client data sitting on the platform can be deleted quickly if the client requests.

There is also a worry about the potential implications of openly publishing data that is in any way inaccurate. Fear that the data could be wrong would likely dissuade anyone from using it and generally damage its reputation. In order to counteract this, a transparent methodology with help from a large number of stakeholders will further encourage confidence in the data. By opening up this methodology as well as the data, there is a way to be able to generate trust in the data that is released.



Lincolnshire Energy Strategic Needs

An open data discovery report

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Katya Bozukova

Open Research Fellow, LORIC

Contents

Introduction	2
Existing Strategies for Energy in Lincolnshire	3
What qualifies as “open data”?	4
Mapping out the existing open datasets for energy.....	4
Nation-wide open data on energy	4
Data.gov.uk	4
Office for National Statistics	8
Department for Business, Energy and Industrial Strategy.....	10
Joint Nature Conservation Committee	11
MHCLG	11
NOMIS	11
BEIS (EU).....	11
Lincolnshire-specific open datasets on energy.....	13
Lincolnshire research observatory.....	13
Lincolnshire Open Data (run by by the Lincolnshire County Council)	13
Relevance to the GLLEP and Lincolnshire County Council’s strategies:.....	13
Gaps in the Open Data on the Sector	16
Gaps in Knowledge.....	18
Energy Needs in Lincolnshire Workshop	19
Organisations Represented:.....	19
Agenda as set by attendees:	19
Key challenges for the energy sector as seen by participants	19
Data signposting.....	22
Data wish list.....	24
Workshopped Challenges	25
Food	26
Infrastructure for heat	27
Final discussions, summary of the day and putting an agenda forward	28
Conclusion.....	28
Acknowledgements.....	29

Introduction

This data discovery report has been prepared by the Lincolnshire Open Research and Innovation Centre for Lincolnshire County Council and the Greater Lincolnshire Local Enterprise Partnership. The purpose of this document is to:

1. **Map out the existing open datasets for energy:** what is available as open data on energy for the nation as a whole and for Lincolnshire county in particular.
2. **Mapping out some of the potential conclusions that can be drawn from that data:** what the datasets can be used for and how relevant would they be to the Lincolnshire energy needs.
3. **Identify the gaps in the open data for the sector:** what data appears to be missing from the sector and what the consequences of that might be.
4. **Identify some of the gaps in knowledge that come from a lack of data:** what data would need to be gathered for Lincolnshire County Council and the Greater Lincolnshire Local Enterprise Partnership to make strategic decisions on the energy sector.
5. **Gather information from key stakeholders:** what do stakeholders consider to be the key challenges for energy in Lincolnshire, what data do they use and need to make decisions, and how they perceive different stakeholders interacting with each other when addressing key challenges for energy in Lincolnshire.

The report will start with a quick overview of the existing strategies for Energy in Lincolnshire, including some documentation from the GLLEP and the Lincolnshire County Council. It will then move onto a discussion about what open data is available, from what publishers, and how up-to-date it is. The report will not analyse any of the open data available but signpost the reader toward any pertinent documents and reports.

Once the report has identified the more relevant data to the energy strategy of Lincolnshire, it will move onto discussing any apparent gaps in the data. It will raise questions about whether research and information pertaining to any cross-cutting themes is as easily available to policy-makers and the general public. It will also consider whether that research and the data from it is fit for purpose, and what gaps in knowledge (if any) might stem from this research.

Finally, the report will look at the discussions that occurred in the themed workshop facilitated by LORIC on 10/03/2020, which brought together stakeholders from Lincolnshire County Council, various district councils within Lincolnshire, and industry representatives from the sector.

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Existing Strategies for Energy in Lincolnshire

The Greater Lincolnshire Local Enterprise Partnership's Energy strategy (July 2019) outlines the following four ambitions:

1. Secure, low cost, low carbon energy across Greater Lincolnshire through:
 - a. Energy Resilience
 - b. Affordable energy and waste
 - c. Sustainable energy
2. Commercial and residential development in capacity constrained areas through:
 - a. Achievement of aims for housing, infrastructure and growth in business
 - b. Planning best-practice that encourages and incentivises sustainability of development
 - c. A system where Distribution Network Operators (DNOs) are able to invest upfront in infrastructure to support accelerated development
3. A sustainable transport system through:
 - a. Electric Vehicle readiness with enough charging points to make driving electric vehicles as a viable option
 - b. A close partnership with Midlands Connect and neighbouring LEP areas to upgrade transport infrastructure
 - c. Early adoption of new transport technologies
4. A strengthened local energy industry within Greater Lincolnshire through:
 - a. A strong energy industry – generating jobs, upskilling people, and supporting local supply chains
 - b. A strong water and waste management sector
 - c. An energy sector that supports local as well as national needs

The strategy goes on to explain the main barriers to those ambitions as seen by the GLLEP, namely: financial, regulatory, and behavioural barriers that prevent innovative solutions from taking root. Other local challenges as outlined by the strategy document are that: local generation strengths are not reflected in local capacity; rurality poses a problem; transport is very heavy; and the viability of new schemes are often hampered by investors not fully being on board with new developments.

Other documents shared with LORIC by the Greater Lincolnshire Local Enterprise Partnership include a report on better utilities, which draws attention to the local need to find solutions to its long-term utilities' requirement, and a Position Paper on Energy which reflects the views of GLLEP with regard to energy. As stated by the document, the local ambition is to:

- *Establish Greater Lincolnshire as a leader in a national asset around a green hydrogen hub that involves the use of national assets around Immingham and Theddlethorpe*
- *Develop sustainable and energy clean growth by developing a baseline to determine long term energy demand, and develop a robust evidence base as to how best to protect, maintain and enhance our natural capital assets*
- *Put local energy options, clean growth and circular economy methodologies and innovation at the heart of investment decisions and new developments*
- *Build on local green capabilities within the private sector, with a view to develop energy innovation that would be a prime route to export*

- *Work with neighbouring LEP's on solutions that provide the requisite economies of scale to deliver energy in the future*
 - *Reduce carbon emissions to net zero by 2050 with aspirations to go further and faster*
-

With these policy papers in mind, this report will aim to outline datasets and research projects that will further develop the outlined local ambitions and aims. It is worth noting that this report will not be able to provide a complete analysis of all the open data available, but will aim to offer some insight as to the potential knowledge that can be gained from it – as well as offer some estimation on how much further research and feasibility testing might cost.

What qualifies as “open data”?

It is worth taking a moment to remind the Reader of what open data is and is not. The following is an excerpt from LORIC’s data handling protocol, which has been drawn up using the Open Data Institute’s guidance:

Open data is defined by LORIC as:

1. Data that is widely available.
2. That data is published under an open license (OGL 3.0, Crown Copyright, Creative Commons Share-Alike with Attribution, etc.)
3. Open data may be accessed physically (by visiting a library for example) or digitally (by visiting a virtual research repository).
4. Open data may also be one that can be accessed through extrapolation and hypothetical modelling (for example, calculating the working population of a region by using publicly available statistics on employment rate and regional population).
5. Any size dataset can be open data.
6. Data that is put behind a paywall, or data that requires special token authentication (password), or data that requires special token authentication, does not qualify as open.
7. Data that is released in spaces where the poster might be expected to have **an expectation of privacy** do not qualify as ‘open’ and thus should not be republished as such without the author’s explicit consent.

Mapping out the existing open datasets for energy

Nation-wide open data on energy

Data.gov.uk

The Government’s Open Data Portal identifies 235 separate datasets on “energy” that have been published under an Open Government License (401 under all licenses). Of those that were tagged by topic (approximately 169), the majority were about the Environment, followed by datasets on Towns and Cities, and Business and Economy. A small proportion of those datasets were more about government spending and transparency and described the spending of departments such as the Ministry of Justice or the Department for Education:

Topic	Number of Datasets
Business and Economy	29
Crime and Justice	1
Environment	49
Government	17
Government Spending	11
Health	3
Mapping	3
Society	15
Towns and Cities	34
Transport	3

The top publishing authorities according to the aggregator website are:

Publisher	Number of datasets
Department for Business Energy and Industrial Strategy	53
Greater London Authority	21
Department for Energy and Climate Change	19
Joint Nature Conservation Committee	15
MHCLG	14

Local authorities were represented on the aggregator website, although their contributions varied from information pertaining to public spending to information on fuel poverty and CO2 emissions. A lot depended on the choices of the local authority and how frequently they updated their information on the government aggregator website as well as on their own open data portals:

Publisher	Number of datasets
Leeds City Council	4
Plymouth City Council	3
Bristol City Council	2
City of York Council	2
Lincolnshire County Council	2
Warwickshire County Council	1

What this means is that, generally speaking, there are quite a number of relevant datasets published nationally; however certain local authorities are more responsive to calls for open data than others. At present, this is not a significant enough question to debate – in the future, when more and more collaboration and information-sharing will be needed to tackle questions of energy efficiency and climate change, this could be vital. Arguably, the councils that publish the most open data will be at the forefront of that discussion.

Datasets of note:

UK Energy in Brief – Department for Business, Energy and Industrial Strategy ([latest release](#), 2018 data)

Domestic Chargepoint Analysis 2017 – Department for Transport ([raw data](#)) “Experimental statistics on the usage of OLEV-funded domestic chargepoints in the UK in 2017. This includes details of charging events and amount of energy supplied.”

Tracking fuel poverty – Department for Work and Pensions ([2010](#)) “Fuel poverty is the requirement to spend 10% or more of household income to maintain an adequate level of warmth. The energy efficiency of a house can be measured using the Standard Assessment Procedure (SAP). The procedure calculates a number between 1 and 100, low numbers generally indicate that a house has low levels of insulation and an inefficient heating system where as numbers closer to 100 indicate a very energy efficient house. SAP is the Government’s recommended system for energy rating of dwellings. SAP is being used as a proxy for fuel poverty in households of people claiming income-based benefits, given the link between income poverty and fuel poverty. Source: Department for Work and Pensions (DWP) Publisher: DCLG Floor Targets Interactive Geographies: County/Unitary Authority, Government Office Region (GOR), Geographic coverage: England, Time coverage: 2008/09”

Fuel Poverty – Lincolnshire County Council ([2017](#)) “Households in Fuel Poverty using the government Fuel Poverty Low Income High Costs (LIHC) method. The data shows numbers and percentages of households at County, District, and Lower Super Output Area (LSOA) geographies. The dataset is updated annually. Source: Experimental statistics published by the Department for Business, Energy and Industrial Strategy (DBEIS). See the source weblink for further guidance on the statistics and their uses and limitations. (For example, these Estimates of fuel poverty should only be used to look at general trends and identify areas of particularly high or low fuel poverty. They should not be used to identify trends over time).”

Energy Savings Opportunity Scheme – DEFRA ([2020](#)) “The Energy Savings Opportunity Scheme (ESOS) applies to large undertakings operating in the UK. The rules relating to the scheme are set out in the Energy Savings Opportunity Scheme Regulations 2014 (Regulations). The Regulations require large undertakings to notify the ESOS administrator that they have complied with the scheme requirements. Full details about the scheme including the full list of questions to which this data relates are provided in the ESOS guidance document which can be found on the ESOS page of GOV.UK. These are subsets of information submitted by the scheme applicants who submitted their notifications of Phase 1 compliance by 31 May 2018 and Phase 2 notifications as at the 10 January 2020. We publish this data to meet our statutory responsibility under the Energy Savings Opportunity Scheme Regulations 2014 and also in accordance with government open data policies. The datasets do not include data which we have determined to be personal data, this is protected under the General Data Protection Regulations. The data contained in the spreadsheet has not been verified to confirm the compliance of these organisations with the ESOS Regulations 2014, it is purely a record of those organisations that have notified us that they are compliant for each relevant phase of the scheme. Where there are elements of the information provided that appear non-compliant these will be picked up and addressed in compliance auditing which we undertake during each four year phase. The data is

published as provided. Attribution statement: © Environment Agency copyright and/or database right 2016. All rights reserved.”

Climate Change Civil Penalties – Environment Agency (2020) “Civil Penalties issued under a climate change regime: European Union Emissions Trading Scheme (EU ETS), CRC Energy Efficiency Scheme (CRC), Energy Savings Opportunity Scheme (ESOS), Fluorinated Greenhouse Gas regime (F-Gas) and Climate Change Agreements (CCA) Attribution statement: © Environment Agency copyright and/or database right 2017. All rights reserved.”

CO2 Emissions – Lincolnshire County Council (2019) “This data shows total CO2 emission estimates in tonnes of CO2 per Person per Year. This government data aims to provide nationally consistent carbon dioxide emission estimates at local authority and regional level (methodology may be subject to refinement hence estimates may be recalculated for previous years). On their own, however, these estimates cannot give all the information necessary to plan and monitor the progress of all local emissions reduction initiatives, this may require additional local monitoring. Supporting methodology information and further data, for example, CO2 sub-totals shown by sector, are available from the source weblink. Source: Department for Business, Energy and Industrial Strategy (DBEIS), UK local authority and regional carbon dioxide emissions national statistics. This dataset is updated annually, usually June.”

Hospital Estates and Facilities Statistics – Department for Health and Social Care (2013) “The data provides a central source of information on the estates and facilities services in the NHS. It covers such aspects as the size of the estate, quality of its buildings, energy efficiency and sustainability data, hospital cleaning and hospital food. Source agency: Health Designation: Official Statistics; not designated as National Statistics; Language: English Alternative title: Hospital Estates and Facilities Statistics”

Energy Crops Scheme Agreements – Natural England (2019) “Energy Crops Scheme Agreements – based on Probis extract. Attribution statement: Attribution statement: © Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right [year].”

Energy Performance of Buildings – MHCLG ([release pending](#))

Domestic Energy Factfile – Cambridgeshire Insight ([release pending](#))

Historic Flood Warnings – Environment Agency (2020) This record is for Approval for Access product AfA435. Listing of Severe Flood Warnings, Flood Warnings and Flood Alerts issued since the flood warning system went live on January 26th 2006 to the present. This dataset includes flood warnings issued by the Environment Agency. Flood warnings are issued for flooding from rivers and the sea and, for a limited number of locations, for groundwater flooding. There are three flood warning codes and a notification when warnings are removed. These are: - Severe Flood Warning: Severe flooding. Danger to life. - Flood Warning: Flooding is expected. Immediate action required. - Flood Alert: Flooding is possible. Be prepared. - Warning no longer in force: Flood warnings and flood alerts that have been removed in the last 24 hours. Live flood warnings in force are shown on GOV.UK and are available as a separate live feed on GOV.UK. Attribution statement: © Environment Agency copyright and/or database right 2015. All rights reserved.

Flood Warning Areas – Environment Agency ([2019](#)) This record is for Approval for Access product AfA054 Flood Warning Areas are geographical areas where we expect flooding to occur and where we provide a Flood Warning Service. They generally contain properties that are expected to flood from rivers or the sea and in some areas, from groundwater. Specifically, Flood Warning Areas define locations within the Flood Warning Service Limit that represent a discrete community at risk of flooding. A discrete community is a recognised and named geographical community, which can be an urban area, a significant suburb of a large city or a village or a hamlet. The purpose of Flood Warnings are to alert people that flooding is expected and they should take action to protect themselves and their property. Flood Warnings are issued when flooding is expected to occur, Severe Flood Warnings are issued to similar areas when there is a danger to life or widespread disruption is expected. INFORMATION WARNING: Groundwater flood warning areas are properties based, usually containing a discrete urban area, suburb, city, village or hamlet and were created in various ways. In general, technical specialists used the national groundwater dataset, historical maps, bedrock geology and records of properties affected by groundwater flooding in the past to create the groundwater flood warning areas. Additional data sources, including groundwater susceptibility maps, borehole data, local modelling and LiDAR may also have been used depending on the location of the area. The triggers for Flood Warnings for groundwater flooding are based on actual observed groundwater levels. There are currently no flood risk maps for groundwater so our flood warning areas for groundwater tend to cover properties which we know have been flooded by groundwater in the past. Attribution statement: © Environment Agency copyright and/or database right 2019. All rights reserved.

Flood Map for Planning – Environment Agency ([2020](#)) The Flood Map for Planning (Rivers and Sea) includes several layers of information. This dataset covers Flood Zone 2 and should not be used without Flood Zone 3. It is our best estimate of the areas of land at risk of flooding, when the presence of flood defences are ignored and cover land between Zone 3 and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year. This dataset also includes those areas defined in Flood Zone 3. This dataset is designed to support flood risk assessments in line with Planning Practice Guidance; and raise awareness of the likelihood of flooding to encourage people living and working in areas prone to flooding to find out more and take appropriate action. The information provided is largely based on modelled data and is therefore indicative rather than specific. Locations may also be at risk from other sources of flooding, such as high groundwater levels, overland run off from heavy rain, or failure of infrastructure such as sewers and storm drains. The information indicates the flood risk to areas of land and is not sufficiently detailed to show whether an individual property is at risk of flooding, therefore properties may not always face the same chance of flooding as the areas that surround them. This is because we do not hold details about properties and their floor levels. Information on flood depth, speed or volume of flow is not included. Attribution statement: © Environment Agency copyright and/or database right 2018. All rights reserved. Some features of this map are based on digital spatial data from the Centre for Ecology & Hydrology, © NERC (CEH). © Crown copyright and database rights 2018 Ordnance Survey 100024198

Office for National Statistics

The office for National Statistics (ONS) has 79 statistical bulletins, 9 articles, 213 time series, 30 datasets and 61 pieces of user requested data relating to energy. Most of them pertain to low-carbon and energy usage, as well as the current energy needs of the manufacturing and service sectors.

Datasets of note:

Energy Use: (2019) “Data showing the relationship between the UK Environmental Accounts and the Digest of UK Energy Statistics (DUKES), 1990 to 2017.”

Manufacturing and production industry: (2019) “UK manufacturing and other production industries (such as mining and quarrying, energy supply, water supply and waste management), including total UK production output, and UK manufactures' sales by product and industrial division, with EU comparisons.”

Index of production (2019) “Movements in the volume of production for the UK production industries: manufacturing, mining and quarrying, energy supply, and water and waste management. Figures are seasonally adjusted.”

Low carbon and renewable energy economy, UK: (2018) “Estimates of the size of the UK's green economy from the Low Carbon and Renewable Energy Economy Survey, including turnover, employment, investment and trade.”

Energy, goods and services used by UK businesses Statistical bulletins (2016-2018) “Detailed product by industry proportion estimates using the results from the Annual Purchases Survey 2018.”

Index of Production time series (2020) “Movements in the volume of production for the UK production industries: manufacturing, mining and quarrying, energy supply, and water and waste management. Figures are seasonally adjusted.”

Atmospheric emissions: greenhouse gases by industry and gas (2019) “Data on the emissions of carbon dioxide, methane, nitrous oxide, hydro-fluorocarbons, perfluorocarbons, sulphur hexafluoride, nitrogen trifluoride and total greenhouse gas emissions, UK, 1990 to 2017 and provisional 2018.”

Atmospheric emissions: acid rain precursors by industry and gas (2019) “Data on the emissions of sulphur dioxide, nitrogen oxide, ammonia, and total acid rain precursors, by industry (SIC 2007 group - around 130 categories), UK, 1990 to 2017 and provisional 2018.”

Atmospheric emissions: other pollutants by industry and gas (2019) “Data on the emissions of PM10, PM2.5, carbon monoxide, non-methane volatile organic compound, Benzene and 1,3-Butadiene, by industry (SIC 2007 group - around 130 categories), UK, 1990 to 2017 and provisional 2018.”

Oil and Gas: reserves and resources (2019) “Estimates of the UK's remaining recoverable oil and gas reserves and resources.”

Low carbon and renewable energy economy estimates (2020) “Annual estimates of low carbon and renewable energy economy activity in the UK and constituent countries: turnover, employment, exports, imports, acquisitions, disposals and number of businesses.”

UK Environmental Accounts Statistical bulletins (2010-2019) “Measuring the contribution of the environment to the economy, the impact of economic activity on the environment, and society's response to environmental issues. Satellite accounts to the main UK National Accounts.”

Department for Business, Energy and Industrial Strategy

The Department for Business, Energy and Industrial Strategy is part of the UK government. It has 798 different kinds of research and statistics published on its website, with additional ones upcoming. 496 of those pertain to the environment, while a further 32 pertain to Housing, Local, and Community.

Datasets of note:

Renewable Heat Incentive deployment data (2020) “Statistics for the Renewable Heat Incentive (RHI) programme detailing the number of applications and accredited installations on the non-domestic and domestic schemes so far.”

Weekly Road Fuel Prices (2013-2020) “BEIS publishes road fuel price statistics providing average UK retail 'pump' prices on a weekly basis.” **Energy Trends UK Renewables (2013-2020)** Data on the UK’s renewables sector, including capacity, electricity generation and liquid biofuels consumption.

BEIS Public Attitudes Tracker: Wave 32 (2020) Findings from the 32nd quarterly wave of the BEIS Public Attitudes Tracker (PAT).

Household Energy Efficiency Statistics, headline release (2020) Household Energy Efficiency Statistics, headline release (January 2020).

Final UK greenhouse gas emissions national statistics (1990 to 2018)

Annual January prices of road fuels and petroleum products (2013-2020)

International road fuel prices (2013-2020) BEIS publishes comparisons of road fuel prices against other EU countries, using data from the European Commission Oil Bulletin.

Domestic energy price indices (2013-2020)

Energy Trends: UK total energy (2013-2020)

Energy Trends: UK solid fuels and derived gases (2013-2020)

Energy Trends: UK oil and oil products (2013-2020)

Energy Trends: UK gas (2013-2020)

Energy Trends: UK electricity (2013-2020)

Energy Trends: UK weather (2014-2020)

Sub-regional Feed-in Tariffs statistics (2013-2020) Number of installations and total installed capacity by technology type at the end the latest quarter.

Solar photovoltaics deployment (2014-2020) Monthly deployment of all solar photovoltaic capacity in the United Kingdom.

Energy Trends and Prices statistical release (30th January 2020) The latest provisional monthly energy production, consumption and prices statistics produced by the Department for Business, Energy and Industrial Strategy.

Joint Nature Conservation Committee

All work

MHCLG

The Ministry for Housing, Communities and Local Government has 10 datasets published on environment and a further 451 on housing, local and community. Relevant datasets of note are pertaining the house building and energy efficiency of new builds.

NOMIS

From the website:

“Nomis is a service provided by the Office for National Statistics, ONS, to give you free access to the most detailed and up-to-date UK labour market statistics from official sources.”

It contains data from the following sources:

- Annual Civil Service Employment Survey
- Annual Population Survey/Labour Force Survey
- Annual Survey of Hours and Earnings
- Business Register and Employment Survey
- Census
- Claimant Count
- DWP Benefits
- Jobs Density
- Jobseekers Allowance
- Life Events
- Population Estimates/Projections
- Regional Accounts
- UK Business Counts
- Workforce Jobs

Nomis data does not pertain directly to energy; however, some of that data can be used to add depth to research on a more local level, and help build an understanding about the population and their needs. For example, the Local Enterprise Partnership Profile for Greater Lincolnshire provides a quick overview not just of the resident population, but also economic activity, average earnings, qualifications, job density, and businesses. With data from other agencies, data on companies and labour can give additional information about the status of Greater Lincolnshire per county and per ward, what the estimated energy needs and impacts are, and what that means for the UK's overall targets with regards to climate change.

BEIS (EU)

The European Commission's Department for Business, Energy and Industrial Strategy has insights about the internal market, industry, entrepreneurship and SMEs. For the United Kingdom, it holds information on the following regions:

- EAST MIDLANDS

- EAST OF ENGLAND
- LONDON
- NORTH EAST
- NORTH WEST
- SOUTH EAST
- SOUTH WEST
- WEST MIDLANDS
- YORKSHIRE AND THE HUMBER

Datasets of note:

Key Enabling Technologies (KETs) Database for SMEs “The KETs Observatory aims to provide EU and national policy makers, and business stakeholders with quantitative and qualitative information on the industrial deployment of Key Enabling Technologies both within the EU and in comparison to other world regions (East Asia and North America)”

Regional Innovation Monitor Plus “In the context of the growth and investment package set out in the Investment Plan of the European Commission, the Regional Innovation Monitor Plus (RIM Plus) provides a unique platform for sharing knowledge and know-how on major innovation and industrial policy trends in the EU regions.”

The Regional Innovation Report for the East Midlands (2014) “The East Midlands is traditionally recognised for its strengths in manufacturing, with transport equipment and food & drink significantly more productive in the region than nationally. With a decline in traditional industry and relative growth in the service sectors, the East Midlands shares many similar challenges to other English regions, and presents a mixed picture across a number of economic indicators. The region performs relatively well against long-term unemployment, but displaying lower GDP per capita and lower labour productivity than some comparators. Employment in agriculture remains high compared to the national average, though specialisation and employment in 2 or 3 star clusters remain muted or low. The labour market picture remains mixed, with higher education and life-long learning indicators, and labour market efficiency lagging slightly behind the UK but ahead of the EU27 average.”

All tools and databases

Lincolnshire-specific open datasets on energy

Lincolnshire Research Observatory

The Lincolnshire Research Observatory is a data hosting platform that contains information on topics such as Access to Services, the Environment, and Health. The Lincolnshire Research Observatory contains both raw data and written reports that can be accessed and used by anybody. However, the various topics on the website have not been recently updated and it appears that data contribution has gone down in the past two years. It is possible that the website will receive an influx of new data with the publication of the 2021 Census, but in the meantime, it is more a historic resource for energy needs in Lincolnshire than a current one.

- **Access to Services** (last updated 2017)
- **Housing** (last updated 2018)
- **Environment** (last updated 2018)
- **Health** (last updated 2018)
- **Lincolnshire Economic Briefing** (last updated 2019)

Lincolnshire Open Data (run by the Lincolnshire County Council)

Lincolnshire Open Data is a CKAN website that is run by the Lincolnshire County Council. It has comparatively recent data that pertains to energy and the environment, including CO2 Emissions per capita and Household Waste and Recycling. The site is slowly being populated and appears both current and topical. However, in terms of variety and quantity, it will take some time before it is fully operational.

- **Average Rainfall Temperature** (2020)
- **Household Waste and Recycling** (2019)
- **CO2 Emissions** (2019)
- **Land and Building Assets** (2019)
- **Fuel Poverty** (2019)

Relevance to the GLLEP and Lincolnshire County Council's strategies:

What the available open data sets highlight, on first examination, is the overlap between the energy industry and other sectors. It is not possible, for example, to discuss electric vehicle rollout without talking about electric charge point usage at private residences and whether new builds meet all the requirements for such usage over the long term. It is also not possible to talk about energy needs in Lincolnshire without touching on fuel poverty and how that connects to people's health and social care, particularly as the population ages.

While the datasets mapped out in this report are diverse, both in terms of what they represent and how often they are updated, they can offer several avenues for research as pertaining to the strategies of the GLLEP and Lincolnshire County Council.

1. Secure, low cost, low carbon energy across Greater Lincolnshire through:

- a. **Energy Resilience:** MHCLG data pertaining to the energy efficiency of buildings can be a valuable resource, not only in understanding the energy efficiency of existing dwellings builds, but also in making some assumptions about the energy efficiency of new buildings. Datasets about the energy efficiency of old buildings and public buildings can also give indications about what realistic energy resilience targets might be, and the data could help developers extrapolate how much it would cost to make an old build energy efficient again.
- b. **Affordable energy and waste:** The datasets collected on data.gov.uk and Lincolnshire Open Data on fuel poverty are crucial in understanding not only the challenges to sustainable energy, but also the things large swathes of the population might consider to be insurmountable barriers to adopting a more sustainable low carbon energy model. Fuel poverty is likely to become a flashpoint issue as the population ages. Furthermore, fuel poverty represents a significant overlap between the interests of the energy and those of the health and care sectors in Greater Lincolnshire.
- c. **Sustainable energy:** BEIS data on UK energy supplies (particularly wind and water) could be used in conjunction with any local geographic and meteorological data to extrapolate what sustainable energy projections might look like for Lincolnshire. This data can then be used to attract investment in appropriate developments of infrastructure and builds to help generate sustainable energy.

2. Commercial and residential development in capacity constrained areas through:

- a. **Achievement of aims for housing, infrastructure and growth in business:** Datasets such as the Domestic Charge point analysis can help with the predictions and planning for customer behaviours as electric vehicles are being rolled out. While the data is still experimental, it could potentially become an invaluable resource in terms of estimating the strain placed on the energy grid as more and more electric vehicles become introduced. Furthermore, it can help new housing developments in terms of building the infrastructure needed to sustain those vehicles.
- b. **Planning best-practice that encourages and incentivises sustainability of development:** Data from BEIS and BEIS (EU) regarding the Regional Innovation Motivators and Key Enabling Technologies can serve to predict behaviours of businesses and entrepreneurs around signing up for new initiatives and coming up with their own sustainable best practices. The MHCLG has also published a number of datasets pertaining to the energy efficiency of buildings that are relevant to the topic.
- c. **A system where DNOs are able to invest upfront in infrastructure to support accelerated development:** A number of the datasets pertaining to the energy opportunities discussed in point 1 might be helpful for Distribution Network Operations (DNOs) in investing upfront in infrastructure to support accelerated development. This data can further be supplemented with local economy data which could potentially reassure funders that their investment would yield returns over a sustained period of time.

3. A sustainable transport system through:

- a. **Electric Vehicle readiness with enough charging points to make driving electric vehicles a viable option:** Datasets such as the energy savings opportunity scheme or the domestic charge point analysis can be used to predict and plan for customer behaviours as new energy savings schemes are being rolled out.
- b. **A close partnership with Midlands Connect and neighbouring LEP areas to upgrade transport infrastructure:** As of right now, not many local authorities are making pertinent data open, or at least they are not publicising it in a way that makes it easier to find. Encouraging more data sharing and open data publication between Midlands Connect and neighbouring LEP areas might be a goal worth pursuing as this would likely become crucial in informing any joined-up efforts on energy.
- c. **Early adoption of new transport technologies:** Data regarding the energy efficiency of public buildings might be useful in the discussion on the early adoption of new transport technologies. Likewise, county-wide data on the state of infrastructure, and the availability of energy sources that can be used for sustainable transport would be crucial in selecting and rolling out new transport technologies. Equally, historic flooding notices and flood maps are invaluable for this sector as flooding brought on by climate change can have significant knock-on effects on the energy needs of the county and the development of energy infrastructure.

4. A strengthened local energy industry within Greater Lincolnshire through:

- a. **A strong energy industry – generating jobs, upskilling people, and supporting local supply chains:** Data from NOMIS is crucial in understanding the energy sector in Lincolnshire with regards to the jobs and skills available. The website has significant data that could help extrapolate not just the current state of affairs – how many people are employed, on what level, and what skills they have – but also how things might change in coming years. The energy sector in Lincolnshire in particular has a large population of workers over the age of 50 who would be expected to retire in the coming years – and the number of young people entering the workforce does not appear to match that number.
- b. **A strong water and waste management sector:** As with the energy industry, the data from NOMIS can help illustrate the current state of skills and workforce availability, as well as predict future challenges. Furthermore, understanding the types of jobs that are likely to come as the sectors become more efficient is crucial, which is why reports like the [UK Probability of Automation](#) are important.
- c. **An energy sector that supports local as well as national needs:** Datasets that pertain to the energy performance of buildings – both private and public, can help with more accurate predictions for the energy that can be produced within Greater Lincolnshire and how it can be used. Furthermore, all environmental data from the ONS could be used in order to understand local and national needs, and better adjust new initiatives in the energy sector to those needs.

Gaps in the Open Data on the Sector

The data available on the energy sector is diverse and varied. It also comes from a number of different sources, which is good from a research standpoint as it provides an opportunity to cross-reference and enrich existing datasets. However, the usefulness of the data for the sector is reliant on the datasets being updated frequently. On the local level in particular, updates on Fuel Poverty, the JSNA for Health and Social Care, and the Lincolnshire County Energy Brief are crucial in helping stakeholders engage with the work.

In terms of data that is missing or incomplete, the following have been identified as potentially having a crucial impact on the future needs of the energy sector:

- **Flooding, flood risks, flood mitigation:** While the environment agency has been releasing multiple datasets pertaining to floods and historic flood warnings, local data related to flood risks and flood mitigation needs to be released frequently and publicly. This would help the planning and development, not just of new builds, but also the selection and rolling out of new sustainable transport networks. Furthermore, data related to flood risks and flood mitigation has the potential of being life-saving, particularly when used by the health and social care sector to plan for times of crisis.

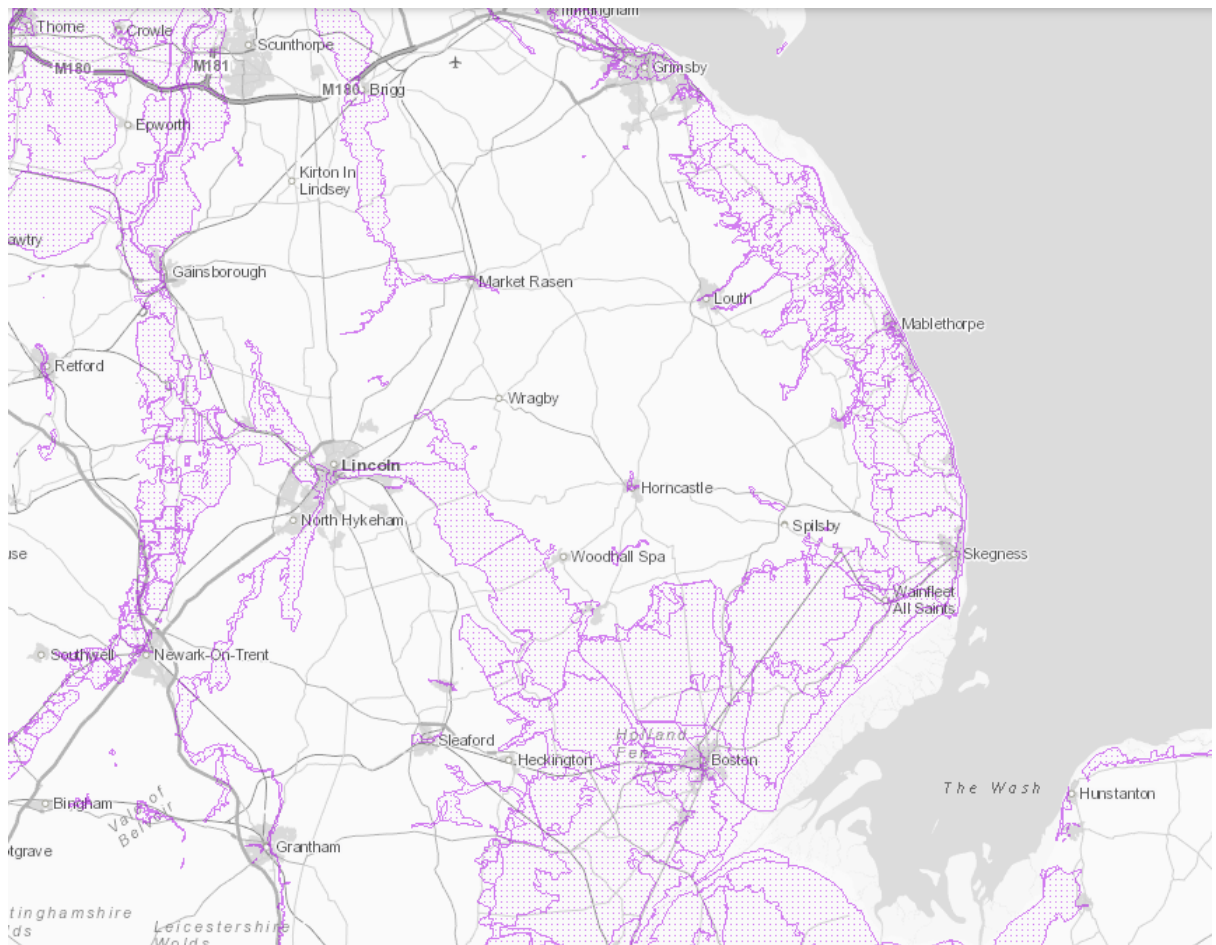


Figure 1: DEFRA Historic Flood Warnings Map

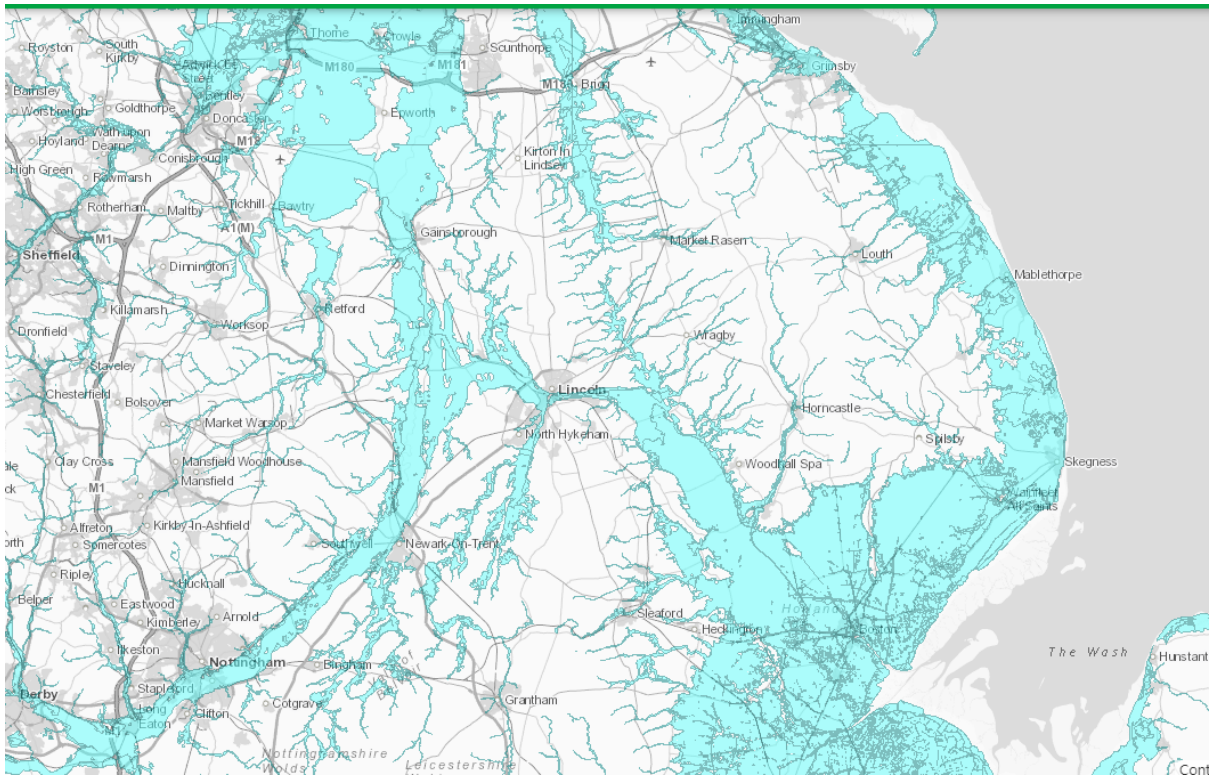


Figure 2: DEFRA Flood Map for Planning Rivers and Sea Flood Zone 2

- Automation and the workforce: The last probability of automation report pertained to the risks of automation for various industries in 2011 and 2017. Data pertaining to actual automation of industries in Lincolnshire, and the risk of the energy and water management industries becoming more automated in 2020, will be crucial. Some information that may not have been included in the original report by the ONS, could pertain to the existing skills of the workforce, the makeup of that workforce (in age, in qualifications, in fitness for work) and the supply of overseas labour following Brexit. All these factors could potentially have an impact on the probability of automation – and with it, the competitiveness of the Lincolnshire energy sector – but it is unclear how many of them were included in the last report.
- Skills on-flow and off-flow: Closely connected to the question of automation is the supply of skills and the number of new entrants in each industry compared to the number of recent and future retirees. Lincolnshire as a county has an aging demographic, and the workforce of the energy and water industries is made up of a high percentage of over 50's, and a very small percentage of under 25's. This may reflect the changing nature of the work, but it could also mean that a loss of insider knowledge and skills will be imminent unless the people retiring from the field are given the option to transfer that knowledge within the company.
- Land usage as well as land assets
- Data from neighbouring LEPs and publicity on data from neighbouring LEPs: While some local authorities have been working hard on publishing open data, many more have not done so or publicised their open data repositories in a way that drives traffic and knowledge sharing. As such, there is likely a wealth of data available which has not yet been shared and used to the best of its potential.

Gaps in Knowledge

Some of the gaps in knowledge that have been identified from this report may be filled as more thorough data analysis is undertaken. However, what appears from this initial data gathering exercise is that, as far as energy needs in Lincolnshire go, there is a need for:

- **More understanding of the connections between the state of the economy and adoption of forward-looking energy initiatives.**
A cursory reading of traditional media coverage on the environment, climate change, and forward-looking energy initiatives gives the impression that building energy resilience, creating sustainable energy, and generally advance the sector towards carbon neutrality is only something that can happen if the economy in general is in a healthy state. Questions need to be asked as to whether that is truly the case, or whether applying market logic to the subject of energy is a flawed way of approaching the topic. Another way of approaching the topic would be through looking at the knock-on effects on other industries, the alleviation on services that might come from different energy initiatives, and looking at the social return on investment of an energy initiative.
- **More understanding of the ways in which labour supply impacts the energy sector.**
Understanding the factors upon which the success an energy initiative might depend on is important because there might be data that can help with the decision. The supply of labour, and supply of specific skills in Lincolnshire, might have a significant impact on the success of sustainable energy initiatives – for example, if the energy sector were to become more automated, new entrants to the workplace might need very different skills than the people whose jobs might become obsolete. Similarly, if an initiative means that employers have to invest a significant amount in training, that could have an impact on how quickly the initiative is rolled out. However, there needs to be more data and research before these relationships are quantified.
- **More understanding of the overlap between energy and other industries.**
As stated in this report, the energy sector has multiple overlaps with other industries. Fuel poverty likely has an impact on health and social care; as does infrastructure. Quantifying those relationships requires more data.
- **More understanding on the potential flashpoints that might prevent the early adoption of forward-looking energy and transport initiatives.**
Connected to the above point is the question of social inequality and how it might create flashpoints that slow down the adoption of sustainable energy across the county. Families living in houses with poor energy ratings might benefit significantly from moving into a more efficient dwelling, but they may not necessarily have the capital to make that happen. Professionals who work in large cities, but cannot afford to live there, would likely rely heavily on their vehicles and be hesitant to swap their cars. Understanding these flashpoints can help predict and plan for challenges for the adoption of energy efficient initiatives.

Energy Needs in Lincolnshire Workshop

On Tuesday 10/03/2020 an Energy Needs Workshop was held at LORIC in order to gain a better understanding from stakeholders about what they consider to be the main challenges for Lincolnshire, the datasets that they can signpost to, and the data they would have liked to have access to in order to take on the challenges they outlined. Of 11 sign-ups, seven attended.

Organisations Represented:

- Lincolnshire County Council.
- Nottingham City Council.
- Western Power.
- West Lindsey District Council.
- VPI-I.
- South Holland District Council.
- NHS.
- Midlands Energy Hub.

Agenda as set by attendees:

- Proactive development – what data can we make public without it becoming a burden?
- Overlapping challenges and tackling the problem collaboratively.
- Climate just model.
- Long-term modelling and strategy planning around new energy sources.



Key challenges for the energy sector as seen by participants

There were eight main themes identified by the participants. While the themes were separated for the sake of maintaining focus, it was largely agreed by participants that there was overlap between them, as energy as a sector, is something that influences and is influenced by multiple social and economical spheres.

Indeed, the main overarching theme for all the key challenges appeared to be that of funding: who pays for interventions, how are stakeholders identified and brought onboard, and how individual behaviour might be influenced through the elevation of people's Energy IQ. The need for more funding for energy initiatives was brought up against every subsequent challenge that the participants identified, regardless of whether it pertained to infrastructure, housing, social inequality, the supply of skills, transport, waste management, or the climate crisis.

Furthermore, all attendees agreed that Brexit and other similar changes to the UK's behaviour as a global player would likely have an effect on each of the main challenge themes, be it in terms of regulation, labour supply, or the ease at which collaboration between scientists and policy makers occurs.

More specific challenges:

Who pays? Funding, buy-in, process **Infrastructure: fuel poverty, mobility, planning, buy-streamlining, education, Energy IQ** **Infrastructure: fuel poverty, mobility, planning, buy-in from public and business, heat**

- Public perception of CO2
- Elevating people's Energy IQ
- Lack of insurance for business for switching to low carbon
- No new homes connected to gas grid by 2025
- Sharing out the outputs and knowledge from this workshop into IDRIC/ISCF
- Who bears the cost of energy initiatives?
- Central government policy
- Public perception of hydrogen
- Collaboration
- How business takes on decarbonisation
- Research Industry collaboration
- Cost of switching to low carbon/low energy on business and consumers
- Funding
- Where does it come from?
- Who profits?
- Resources – hardware as an example – lead time
- Energy demand increase due to new technologies
- Big data energy storage will require more energy
- Infrastructure in a rural environment
- Waiting for clear direction from government
- Industry inertia
- Lack of innovation
- Building of large-scale shared infrastructure
- Local area policy assistance from planners and policy makers
- Local government lack of specialisation/knowledge
- Aging utility infrastructure
- Smart grid.
- Localised energy solutions for rural areas.

Labour: supply of skills, workforce resilience

- Transition to low carbon labour
- Upskilling from high carbon industries
- Skills supply
- Labour supply
- Training

Waste management

- Circular economy – understand the energy required for the life time of something
- Waste – lack of access to local disposal facilities
- Lack of co-operation between industry and local authorities
- Climate change and sustainability

Housing: New builds, sustainable housing, deconstructions, retrofitting ban on wet wood and coal

- Understanding the growth of need in rural areas
- Ban on coal, wet wood
- Risk of higher fuel poverty
- How to retrofit
- Renewal of support for supply of energy

Transport

- EV demand increase by 2025
- Customer attitudes to EVs
- EV energy needs
- EV's and whether the infrastructure is ready for them
- Rolling out EV for public transport
- Impact of floods and flood resilience on the rolling out of EVs for public or private usage
- Alternatives to EV – hydrogen cells and how far people are in the production of those

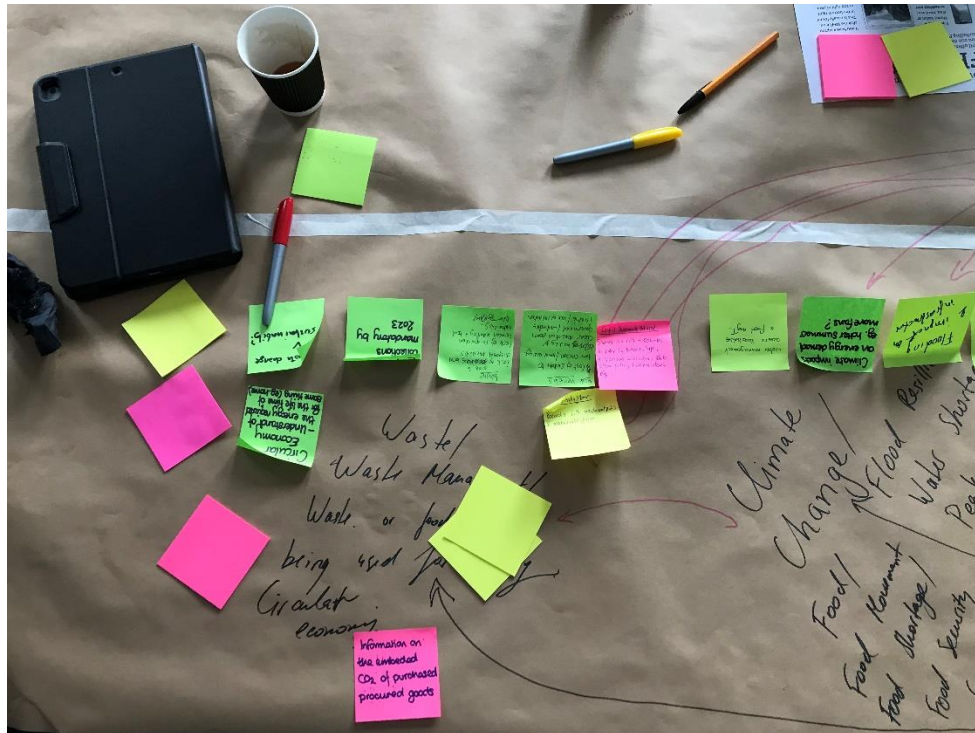
Social: regional disadvantages, social disadvantages, population specificities, health and wellbeing

- Overlap between health and social care sector and energy
- Energy demand increase for an aging population
- Digitization in rural areas to improve access to services?

Climate change: food, food movement and storage, food security, green energy production and how that impacts agriculture, flood resilience, water shortage, peak waves and water management and storage

- Food waste collections mandatory by 2023
- Water - too much or not enough
- How do commercial businesses take on the challenge?
- Flooding and impact of flooding on infrastructure
- Climate impact on energy demand
- Water management across Lincolnshire and flood mitigation
- Policy around climate change adaption measures

Data signposting



Once participants were comfortable with having identified some key challenges for energy in Lincolnshire, they were also asked to think of datasets that they used for each of these themes, as well as the datasets they hoped they could have access to in the future. They were also shown the preliminary results from this report and asked to consider what else is available to them.

Among the datasets identified were the following:

Who pays?

- [GMCA CBA Tool](#)
- [Climate Just](#)
- [Met office cc data](#)
- [Heat networks research](#)
- [HNIP](#)

Infrastructure:

- [Domestic Chargepoint analysis](#)
- [Wastedataflow](#) - Records LA waste outputs and materials flow
- [MapThat](#) for geographical info, measurements, can overlay financial info such as business scales
- [Scatter](#)
- [UKRN Data Sharing for infrastructure](#)
- [MappingGM](#)
- [EU ETS](#)
- [European Emissions Trading Scheme](#)
- [WPD flexible dataset](#)

Housing:

- [MHCLG new houses build data](#)
- [Household Waste and Recycling](#)
- [Energy Use](#)

Social:

- [Fuel poverty in Lincolnshire](#)

Labour:

- [The catch training centre](#) provides data on apprentices in the region
- [Nomis](#)
- [BRES Business register and employment survey](#)
- [Travel to work data](#)

Climate change:

- [Met office](#)
- [Weather station data](#)
- [UK CPIs](#)
- [Modelling data](#)
- [Declare a climate emergency website](#)
- [CO2 emissions](#)

Transport

- [Guide to managing grey fleet mileage](#)

Waste management

- [Circular material use rate](#)
- [NESTA Smart resources \(not open\)](#)



Data wish list

When asked about the data they wished they had access to, participants suggested datasets that were like the ones that were already available, but with more detail. Some of the datasets that were suggested were very specific to the private sector, while others were more general.

Who pays?

- Team Sigma Half Hourly meter readings
- Investor database
- Private Sector Investment
- Cost benefit analysis tool for wider impact
- Stalled energy projects
- A central location for data on: energy, transport and waste
- LA tool for net zero planning

Housing

- New builds
- Sustainable housing
- Deconstructions
- Retrofitting
- Impact of ban on wet wood and coal

Infrastructure

- Power and emissions below 50MHW
- Datasets for this equipment
- Council benchmark dataset – shows a LA's and columns by authority type and various indicators to allow policy benchmarking
- Network capacity – estimated grid connection costs, connection costs on areas according to MW of project
- Commercial data
- Rural and Lincolnshire information portal and dataset
- University datasets which is available for communities
- What are the skills and the local supply chain
- Difficult to gather data
- Who is in fuel poverty
- Deployment stats

Climate change

- Food, food movement and storage, food security
- Green energy production and how that impacts agriculture
- Flood resilience
- Water shortage
- Peak waves and water management and storage
- Accurate figures for LCC area wide CO2 emissions
- Information on the embedded CO2 of purchased procured goods
- Risk assessment of climate impacts on food production
- Distribution
- Grid connections (where and what size)
- Embedded carbon in packaging
- Packaging materials
- Energy investment in food production (fertilizer) future policy,
- Food waste totals,
- Vehicle movements and fuels, collection costs

Social

- Regional disadvantages quantified
- Social disadvantage by geography
- Regional Demographics
- Population health and wellbeing

Labour

- Impact of universal credit
- Connections between fuel poverty and employment
- Connections between labour and infrastructure

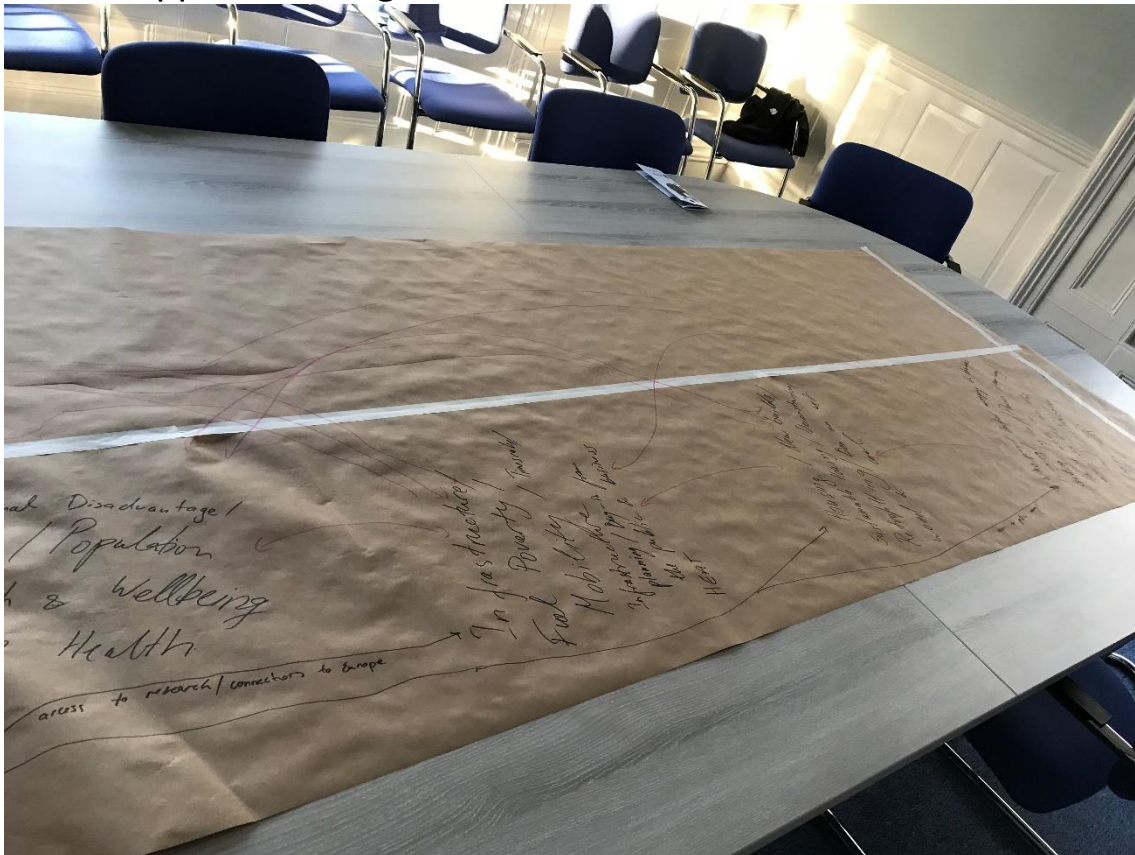
Transport

- Accurate figures for staff mileage for all transport grey fleet

Waste management

- Impact of food collections
- Circular economy real time data
- Barriers and opportunities for the circular economy

Workshopped Challenges



In the second half of the day, attendees were asked to workshop in groups two of the main themes they identified during the morning. The groups chose heat infrastructure and food (which was part of the larger climate change theme)

Food

The ways in which food and climate change interacted was considered a challenge as it involves multiple complex factors. The group agreed that there was a need for a large lifecycle analysis of the general approach to food, from supply chains through to packaging. The group identified in particular the need for an embedded CO₂ carbon budget and support from supermarkets in order to address some of the ways in which food impacted climate change.

Furthermore, it was largely agreed within the group that the options as they stood now for turning food waste into part of the circular economy were limited. While the technology is there, there were too many factors around the logistics of waste and individual behaviour that made interventions at that stage “too late when its waste”.

By far, attendees agreed that behaviour change on the part of consumers was needed, and that it was very important to get support from behaviour scientists and economists in influencing change. Some of the ways that were proposed to that end were:

- Behaviour changes in consumers – how they select and cook food, how they interact with waste
- Economic incentives for growers, food manufacturers and shops - EFWs, AD, new technologies, transport

The group broke down the problem in the following categories

- Food production
- Food distribution
- Food consumption
- Waste
- Food packaging
- Government policy

It was largely agreed that the following stakeholders had to be brought onboard: farmers, food producers, distribution companies, supermarkets, consumers, community leaders, DEFRA, MPs, packaging companies, National Government Policy Makers, AD Plants owners.

With regards to the data needed the group identified the following themes: Risk assessment of climate impacts on food production, distribution, grid connections (where and what size), embedded carbon in packaging, packaging materials, energy investment in food production (fertilizer) future policy, food waste totals, vehicle movements and fuels, collection costs.

Ideas discussed

1. Food meters rather than miles: finding a way to inform consumers about the impact of their food’s CO₂ footprint in a way that positively changes their behaviour.
2. Using logistics data to track an item “from field to fork”, with the hope of influencing the demand towards more carbon-neutral options.
3. Incentivising the creation and maintenance of more farm shops, including helping them extend business hours and offer online services to capture other markets.
4. Encouraging the buying and preparing of seasonal produce and reducing demand for out-of-season fruit and vegetables with high food miles.

5. Finding ways of encouraging the thinking that “Nice food doesn’t have to be expensive”.
6. Finding ways of using subsidies to promote animal welfare.
7. Reduce choice on the shelves in the hopes of influencing demand and customer behaviour.
8. Systemic policy driven change – it was largely agreed that most of the ideas discussed in the workshop would require systemic policy change and unified messaging from both central and local government.

Infrastructure for heat

The group that workshopped solutions around infrastructure decided to focus on heat networks. In particular, they focused on the ways in which households could be outfitted with more sustainable and carbon-neutral solutions. The discussion ranged from new builds, to the retro-fitting of old houses, to how fuel poverty impacts different social groups and how any intervention would have to be careful not to exacerbate any existing inequalities.

Towards the end of the day, the group discussed the installation of solar panels and how some of the incentives for new builds to be outfitted with solar panels can be brought back. The group agreed that a return of the F1T tariff for residential up to 12 kwh would be a good thing, as previously they perceived the policy as being misused by commercial properties, which precipitated its removal. The group agreed that if the tariff was reintroduced with provisions that limit it to residential properties, it would go a long way of providing consumers with sustainable, low-carbon energy, and significantly reduce some of the burden on the national grid if widespread adoption was achieved.

Other ways in which the group broke down the problem of infrastructure included:

- Lack of open dialogue with DNOs, need to including more major players in the conversation,
- Being more aware of policy and planning; Getting things correct at the beginning, getting capital support;
- Getting a Lincolnshire standard of housing building, Increasing skillset,
- Retrofitting, Heat networks, Localised energy generation,
- Public perceptions, Neighbourhood plan,
- New builds heat networks must be considered in planning,
- Strong business cases to justify costs,
- Onshore windfarm links into local communities and grid

Identified stakeholders:

- DNOs
- Other cities attempting similar initiatives overseas
- Midlands Energy Hub and Rural Community Energy Fund
- Central government, local authority, GLLEP, policy developers, DWP, NHS
- Community regeneration groups, Communities ambassadors, church, schools, parish, local community energy groups
- Councils, Community energy groups, Temporary residents, Third sector
- National grid, CODENT, WPD, Anglia water, Homes England

Datasets required: WPD flexible dataset, ONS data, data related to food, rural and Lincolnshire information portal and dataset, university dataset which is available for communities, what are the skills and the local supply chain, difficult to gather data, who is in fuel poverty, deployment stats, climate just models fuel poverty, UKCPIS met office CC data, Heat networks research NNDU, HNIP, connections and current infrastructure, planned connections and upgrades.

As with the other group, it was largely agreed that multiple stakeholders would have to be involved in the discussion of any intervention, regardless of how it is deployed and which group it focuses on. Indeed, the group argued that both local planners and local community groups would have to work together as interventions take a long time to happen and need consistent support from all stakeholders.

The reintroduction of the F1T tariff was seen largely as one of the most useful ways. Other suggestions raised during the final discussions with regard to the installation of more solar panels involved whether the local authorities might consider buyer incentivising initiatives where the local authority provides the necessary scaffolding and labour and the buyers just pay for the solar panels. As scaffolding is usually the most expensive part of the budget, attendees discussed whether removing the burden of that from the consumer might support the purchase and installation of more solar panels. More discussion would be necessary for such an initiative to come into play, but the potential cost savings and the benefits that could be drawn from the initiative could be considerable depending on the deployment.

Final discussions, summary of the day and putting an agenda forward

By the end of the day the attendees had workshopped a number of ideas and solutions. The most common challenge they came up against was funding and obtaining stakeholder buy-in, however, it was largely agreed that more data is needed as open access in order for a proposal to be feasibility-tested and budgeted. Certain ideas could be tested in the short term through informal discussions with stakeholders, however, much of the data identified by the two groups during the day would be needed before any initiatives are rolled out.

Some of the ways in which the data could be obtained might be through:

- Greater stakeholder engagement: Identifying data holders and obtaining their buy-in for open data publication.
- Having Local Authorities lead the way in terms of data publication, by using existing repositories or investing in their own one.
- Publicising more widely the ways in which open data has influenced the energy sector.
- Encouraging more stakeholder cooperation and involvement of community groups, as both are identified as crucial for initiatives to take root.

Conclusion

The data and technology that will help Greater Lincolnshire achieve its energy ambitions is believed to exist. However, its wider usage and deployment is dependent on the collaboration between stakeholders, their continued investment, and the constant support of both the local authority and the communities that will be first to feel the impact of any new initiative. While there is a lot of data available openly, it is largely agreed that a lot more would be needed for new initiatives to be assessed and feasibility-tested before funding is approved. As such, the chief recommendation of this report would be for more data to be made available – and for that availability to be publicised as widely as possible – as a first step towards the adoption of more forward-thinking energy initiatives.

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The report has been prepared by Katya Bozukova, Open Research Fellow at LORIC. For any questions, comments, or concerns arising from this report, please email loric@bishopg.ac.uk

Appendix: All datasets on data.gov.uk by publisher and by topic

Publisher	Number of datasets
Department for Business Energy and Industrial Strategy	53
Greater London Authority	21
Department for Energy and Climate Change	19
Joint Nature Conservation Committee	15
MHCLG	14
Environmental information Data Centre	10
Forestry Commission	9
DEFRA	8
Environment Agency	7
Cambridgeshire Insight	6
Leeds City Council	4
Department for Business Innovation and Skills	3
Department for International Development	3
DWP	3
Marine Environmental Data and Information Network	3
Marine Management Organisation	3
ONS	3
Plymouth City Council	3
Bristol City Council	2
Cabinet office	2
Calderdale Metropolitan Borough	2
City of York Council	2
Department for Transport	2
Department for Health and Social Care	2
Lincolnshire County Council	2
London Borough of Barnet	2
OpenDataNI	2
Scottish Government SpatialData.gov.scot	2
United Kingdom Atomic Energy Authority	2

Welsh Government	2
Centre for Environment, Fisheries and Aquaculture Science	1
Department for Education	1
Department of the Environment	1
Foreign and Commonwealth Office	1
HM Treasury	1
Healthcare Quality Improvement Partnership	1
HMRC	1
Home Office	1
Lichfield District Council	1
Ministry of Defence	1
Ministry of Justice	1
NHS Digital	1
Natural England	1
Northern Ireland Statistics and Research Agency	1
Office of the Prime Minister	1
The National Archives	1
United Kingdom Hydrographic Office	1
Warwickshire County Council	1

Topic	Number of Datasets
Business and Economy	29
Crime and Justice	1
Environment	49
Government	17
Government spending	11
Health	3
Mapping	3
Society	15
Towns and Cities	34
Transport	3