Frontiers of Fracking

Underground Political Ecology and Unconventional Energy in the Contested Landscapes of North West England

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Master's thesis
Geography, 30 Credits

GA 27
2015
Preface

This Master’s thesis is Joseph Clifford’s degree project in Geography at the Department of Physical Geography, Stockholm University. The Master’s thesis comprises 30 credits (one term of full-time studies).

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The author is responsible for the contents of this thesis.

Stockholm, 1 April 2015

Steffen Holzkämper
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Abstract

Gas obtained from previously unexploited shale rock strata has emerged as an economically viable way of sourcing additional fossil fuel energy resources after the so-called ‘shale gas revolution’ in the United States. In the United Kingdom, the incumbent government has committed to the development of its own shale gas resources. A highly polarised public debate has erupted on the risks and rewards of extracting the shale gas deposits that presently lie underneath large swathes of the country using the controversial method of hydraulic fracturing, or ‘fracking’. This thesis examines how different groups in North West England – the major frontier of fracking in the UK – are contesting, resisting and negotiating the current government’s decision to sanction and push ahead towards the development a domestic shale gas industry. Employing a theoretical framework drawn from political ecology as its core mode of examination, this thesis utilises qualitative methods including in-depth interviews and participant observation techniques. It documents a range of social groupings that are contesting shale gas in the UK in a number of ways, and argues that landscapes and risk are fundamental hinges in this ongoing environmental conflict.
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Acknowledgements

I must express a sincere debt of gratitude to a number of people who have helped me throughout the writing of this thesis.

Firstly, my supervisor, Annika Dahlberg, who introduced me to the world of academic political ecology during a course she teaches at Stockholm University back in Autumn 2013. Her critique on earlier drafts, her scholarly tutelage and her warm encouragement has all been instrumental. The other inspirational teachers at Stockholm University’s Geovetenskap faculty that I have had the pleasure to interact with and learn from during my time there also deserve a big pat on the back. Also, the fieldwork element of this thesis was supported by a generous grant awarded to me by the Albert and Maria Bergström Foundation in Stockholm.

My biggest thanks go to the people I encountered during my fieldwork trip to North West England – to local residents, grassroots activists, community organisers, politicians, business people, fellow students, bed and breakfast proprietors and couchsurfing hosts alike. It was a pleasure to meet and learn from all of you. Those who for some reason agreed to be interviewed by me deserve to be singled out for special praise. The sum of these interactions profoundly enriched my understanding of the changes that are taking place in this region due to the prospect of shale gas extraction.

Last (and by no means least) I must thank all of my close family and friends in both Stockholm and London who have supported and encouraged me… come what may.

Joseph Clifford
Stockholm, March 2015
### Acronyms and abbreviations

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<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tr>
<td>BGS</td>
<td>British Geological Survey</td>
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<tr>
<td>CPRE</td>
<td>Campaign to Protect Rural England</td>
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<tr>
<td>DECC</td>
<td>Department of Energy and Climate Change, UK</td>
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<tr>
<td>DEFRA</td>
<td>Department for Environment, Food &amp; Rural Affairs, UK</td>
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<tr>
<td>FFGM</td>
<td>Frack Free Greater Manchester</td>
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<tr>
<td>IEA</td>
<td>International Energy Agency</td>
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<tr>
<td>IET</td>
<td>The Institution of Engineering and Technology, UK</td>
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<tr>
<td>IGas</td>
<td>Island Oil &amp; Gas</td>
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<tr>
<td>IOD</td>
<td>Institute of Directors, UK</td>
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<tr>
<td>LWT</td>
<td>Lancashire Wildlife Trust</td>
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<tr>
<td>MP</td>
<td>Member of Parliament</td>
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<tr>
<td>NGO</td>
<td>Non-governmental Organisation</td>
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<tr>
<td>NIMBY</td>
<td>Not In My Back Yard</td>
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<tr>
<td>NOMPY</td>
<td>Not On My Planet</td>
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<tr>
<td>NWETF</td>
<td>North West Energy Task Force</td>
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<tr>
<td>PEDL</td>
<td>Petroleum Exploration and Development License</td>
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<tr>
<td>RAFF</td>
<td>Residents Action on Fylde Fracking</td>
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<tr>
<td>ReFINE</td>
<td>Researching Fracking in Europe, University of Durham</td>
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<tr>
<td>RSPB</td>
<td>Royal Society for the Protection of Birds</td>
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<tr>
<td>UK</td>
<td>United Kingdom of Great Britain and Northern Ireland</td>
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<tr>
<td>UKOOG</td>
<td>UK Onshore Operators Group</td>
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<td>US</td>
<td>United States of America</td>
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I. Introduction

As I stood there in an archetypal English meadow amongst a cluster of tents, hastily erected wooden structures of differing sorts (some even up trees), parents with children and other adults talking about “where would be next” and from time to time uttering that infamous word on everybody’s lips, I knew that something peculiar was happening in Britain in 2014. That something is thrusting national energy policy and the complexities of environmental politics into the lives of citizens for whom these issues had previously been of marginal concern. That something is a new word in the lexicon of the British public: fracking.

I was at a protest camp near to Upton just outside of Chester, 35 miles south west of the city of Manchester. This was but one of many encounters I had in England’s fracking frontiers during this research project. In the aftermath of the enormous economic benefits accrued to the United States (US) as a direct result of their so-called ‘Shale Gas Revolution’, the United Kingdom (UK) government has set the country on a pathway for the development of an onshore gas production industry in an attempt to mimic the experience of their Atlantic cousins. Hydraulic fracturing for shale gas (or ‘fracking’ as it is commonly known for short) has now emerged as a headline news item generating heated debate on its potential risks and rewards (Royal Society 2012; Bradshaw 2012; Stevens 2013; Taylor & Lewis 2013; Williams 2013; Cuadrilla 2014; EY 2014; House of Lords 2014; RSPB 2014). Some claim it could be of huge significance to the country’s future energy security and provide a badly needed economic stimulus in the form of newfound wealth for business and the treasury alike, trickling down to citizens in the form of jobs and payments to local communities who live atop the gas rich rock. Others, meanwhile, maintain it is inherently risky and potentially damaging to ecosystem and human health, that it is an energy source which has a distortionary effect on the pursuit of national low-carbon energy transition, and a process that can contribute directly to anthropogenic climate change. In the words of one Lancashire resident interviewed for this thesis: “we’re backing the wrong horse”. Fracking is the shorthand for a process that can access gas deposits in deep subsurface shale rock strata. Shale is a commonly occurring sedimentary rock composed mainly of clay or mud packed so tightly that it is impermeable, so gases and liquids cannot flow through it. Natural gas can form within the pores of shale rock, within naturally occurring fractures, or within the minerals or organic matter contained in the rock. Advances in drilling technology mean that shale gas exploratory drilling companies can combine horizontal drilling techniques with hydraulic fracturing to reach significant quantities of the deposits held within the rocks underground.

This method of so-called ‘unconventional’ fossil fuel extraction, has, in the UK as elsewhere, become a politically sensitive and divisive issue. It has generated a plethora of citizen-led movements fiercely contesting the decision to push ahead with this mode of onshore gas extraction. In the UK, there exists a significant proven reserve of carboniferous shale gas, which has the potential to yield vast quantities of gas as an

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1 Interview 2, RAFF Members / Residents, St. Anne’s, April 2014.
2 Composed primarily of methane (CH₄).
3 The Frack Off UK live interactive map shows the latest count of grassroots groups contesting and resisting fracking in the UK, here: http://frack-off.org.uk/locations.
energy source, and substantial financial rewards. The incumbent coalition government has vowed to go “all out for shale” and has given endorsements to demonstrate it is backing the nascent shale gas industry. Well-researched reports published by highly influential bodies in the UK have stated categorically that hydraulic fracturing can be done safely if adequate regulation is put in place (Royal Society 2012), and that it can deliver key economic benefits (House of Lords 2014). This policy position has prompted a wide-ranging public debate that traverses a number of issues bridging nature and culture. These include: the future energy policy of the UK, corporate power and its relationship to the state, citizens exposure to manmade environmental risks and hazards, and anthropogenic global warming.

Put crudely, the ongoing conflict in the UK is between two core positions – the pro and anti fracking camps – each of which deploy sophisticated political arguments and marshal different versions of scientific evidence to back up their positions. In direct contrast to the pro shale gas papers referenced above, high-profile UK NGOs including Friends of the Earth (Bradshaw 2012) and an alliance of six NGOs led by The Royal Society for the Protection of Birds (RSPB 2014) have released policy papers criticising the “dash for gas” approach taken by the government, the latter citing major shortcomings in the existing shale gas regulatory regime. Large UK civil society organisations such as Greenpeace have also run major campaigns against UK shale gas development and the government’s decision to modify existing trespass laws so that drilling can take place under people’s property without their consent.

The last several years has seen an increase in interest from social scientists in the unfolding socio-political dynamics of shale gas extraction and unconventional energy development more broadly, particularly in the US and Australia (Finewood & Stroup 2012; Andrews & McCarthy 2013; Pearson 2013; Bomberg 2013; de Rijke 2013; Wright 2013; Mercer et al. 2014; Willow 2014a; Willow 2014b). In the UK, by contrast, there has been relatively few works produced yet in the academic social sciences, save a few pieces on the history of shale gas in the UK (Selley 2012; Gu & Nazmy 2014) and a couple of recent Masters theses (Chung 2012; Williams 2013). This is to be expected given the early stage the UK is at with the development of its shale gas resources. Even though a paucity of literature exists at present, there are theoretical approaches in critical geography that are well suited to an examination of the conflict over fracking in the UK today.

In his recent wide-ranging volume on the geographical sub-field of political ecology, Paul Robbins, writing about environmental conflict, maintains that scarcities produced by natural resource enclosure or appropriation by the state, business, or elite groups, can accelerate conflict between social groupings (Robbins 2012: 200). For an observer of UK shale gas it is evident that such a definition accurately describes the present situation where the state, in alliance with industry, are charting a course to appropriate an ever-more scare and thus valuable fossil fuel resource (gas). As an interdisciplinary approach to the social and the ecological, political ecology brings a critical focus on the socially produced nature of environmental injustices and probes complicated power relationships between human agents and institutions. At its core, political ecology asks ‘who wins’ and ‘who loses’ from the process of environmental change,

both in terms of people and in terms of the ecological systems upon which human societies depend for their existence. For these reasons it is well suited as a framework for an analysis of fracking in the UK.

Ever since political ecology took form as a mode of analysis in the late 1980’s, environmental conflicts over natural resources have been a mainstay of analysis. The appropriation of resources by political and economic elites to the detriment of local populations – be it forest timber, agricultural land, or valuable subsurface rock strata – has been subject to treatment by scholars whose work falls into the wider corpus of political ecology (Escobar 2006; Jewitt 2008; and, de Rosa 2014, amongst others). This is especially true in many countries of the so-called ‘Global South’, where mineral and hydrocarbon mining frequently forms a large proportion of a country’s economic activity and capture of such wealth by economic elites is common (Bebbington 2012). Since around the turn of the millennium the field has increasingly turned northward with a recognition by certain scholars (McCarthy 2002; Schroeder et al. 2005) that many of the core themes applied to questions of environmental change in Southern contexts can be applied in advanced capitalist countries of the Global North as well. This shift has been accompanied in recent years by a growing body of literature from the US and Australia that asks questions about the boom in hydraulic fracturing for shale oil and gas using a socio-political lens. Willow (2014) forcefully claims we are entering a “new politics of environmental degradation” wherein vulnerability to new forms of environmental risk has created previously unseen dynamics within mature capitalist countries like the US (and the UK). Today, Willow argues, citizens are exposed to potential environmental risks on an increasingly larger scale, cutting across wealth, race, class, and gender boundaries.

This thesis draws inspiration from this new cohort of scholars. It analyses fracking and the new politics of environmental degradation in North West England, the most active region for shale gas development in the UK to date. It surveys and gives voice to grassroots perspectives, to those who are resisting and contesting the dominant government and corporate discourse on shale gas development; for it is these perspectives that have been seldom recorded in academic work in the UK to date. The UK government and several firms that represent the fledgling shale gas industry are the key actors in pushing for shale gas to become part of the UK energy mix. In North West England, the NTETF, a trade body aiming to advance the interests of the shale gas industry supply chain in the region, is a key actor. Many citizens of the UK are sympathetic towards shale gas extraction, agreeing with the government’s arguments that it can bring economic benefits and increased safeguards from volatile wholesale energy prices on the global market. The intention at the outset of this thesis was to conduct a study that documented and analysed the voices of those on both sides of the fracking debate in the UK, however for reasons outlined in the methodology section this was not possible to do.

The UK is a unique case hitherto under investigated in the political ecology literature examining resource conflicts. Full-scale production of hydraulically fracked gas is still some years away due to the need for additional exploratory drilling and strict planning regulations that must be met. Test drilling that has taken place to date has generated

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5 Cuadrilla Resources, IGas, and Dart Energy.
6 North West Energy Task Force
significant and vocal resistance from civil society both in discourse and in practice. Consequently, and unlike most previous studies that examine unconventional energy in other Anglophone settings (one notable exception comes from Ramasar 2014), this study is one of an ongoing environmental conflict in the midst of a national debate on the pros and cons of extracting the shale gas that lies underneath parts of the UK.

As a piece of physical energy infrastructure, shale gas extraction raises implications for landscapes. Spatially, shale gas extraction requires many thousands of wells on many hundreds of drill pads to be spread across a large expanse of land. These wells require heavy goods vehicles to deliver equipment, chemicals and large quantities of water for the fracking process. This activity coupled with spells of intense drilling will impact on the physical landscape and on the lives of the people living in these areas. It will also fundamentally change the composition of the subsurface geology. As the subsurface geology and the surface ecology are intricately connected through aquifers and geological faults, shale gas extraction has created fears for the potential of the contamination of groundwater via the leakage of chemical additives in fracking fluids and the migration of naturally occurring radioactive materials that return in flowback water. This is an area critically linked to the construction integrity of shale gas wells themselves (Davies et.al 2013) and the well failures that occurred predominantly in the early days of the US shale gas industry, but it is also connected to the migration of subsurface fluids over longer time periods (Myers 2012).

In anti-fracking discourse there is regular talk of how it could “industrialise the countryside” (Green Party 2013), due to the visual appearance of the wells themselves and the intensification of connected industrial activity that will result during drilling. From a geographical perspective the concept of landscape is paramount and raises several implications around aesthetics and the ‘scenic’, the relationship between society and nature, and questions about the encroachment of industrial activity into presently rural landscapes. Landscape is also associated with the risks that shale gas extraction poses in relation to surface and groundwater contamination, habitat loss and fragmentation, and localised air, noise and light pollution. This thesis seeks to delve deeper into the notion of ‘landscape’ and how it connects to shale gas extraction in the UK.

The debate about shale gas and fracking in the UK revolves around the language of potential ecological degradation and hazards at the local and global scales, of national energy security and independence from Russian and Qatari gas, and of regional economic development and rural regeneration. Using the analytical lens of political ecology, this thesis will argue that the present contestation of fracking for shale gas in the UK must be understood as a fundamental reconstitution of physical and cultural landscapes, and one that has already wrought a multitude of socio-political effects in the communities on the frontiers of fracking in North West England. This thesis shall argue for a re-evaluation of the concept of landscape that considers the connections between the surface and the subsurface. Drawing inspiration from the work of political ecologists and anthropologists in the US, it will seek to develop a better understanding of how citizens conceive of the natural world around them, ultimately striving to say something about the relationship between nature and society.
II. Objectives, Aims and Methodology

Objectives

Since the summer of 2013 I have followed the UK public debate about unconventional fossil fuel extraction. It was around this time that shale gas entered wider energy policy discourses as a potential component of the future energy mix meriting serious discussion (Taylor et al. 2013; Peduzzi et al. 2013; Stevens 2013). For any newcomer to this debate, sifting through the wealth of reporting and literature to derive an impartial scientific understanding of ‘the facts’ is a task made difficult by the profusion of conflicting claims of what the ‘true’ science is, combined with the fact that much of the empirical research into shale gas extraction comes from the US, a wholly different political and geological backdrop. Supporters claim it can be done safely and in accordance with carbon reductions targets; opponents claim it is inherently risky and fundamentally fails to address the longer-term issue of the decarbonisation of the energy system. Who is correct? Who is going to win out?

There is an urgent need for analysis that takes one step back and attempts to analyse this quarrel as one between social groups who are differentiated by their relative power in shaping the outcome. Importantly, these social groups are also differentiated by many other factors including how they view landscapes, nature, the exploitation of resources, the relationship between the state and private enterprise, and the needs and priorities of the UK in the twenty-first century. If the UK is to move ahead and confront the challenges of transitioning to a low-carbon energy system then shale gas, as one of the many alternatives, ought to be situated in scholarship that recognises these fundamental power imbalances and knowledge asymmetries.

This study strives to generate analysis in the tradition of political ecology using a case study within an ongoing socio-environmental conflict. This research has been motivated by the growing body of scholarly literature taking a critical political analysis of unconventional energy in the US, and the small but growing body of UK based social science literature examining shale gas. It is my view that this literature has paid too little attention to the concept of landscape as a key fulcrum of this conflict. From a purely normative standpoint, and in keeping with the research ethos of political ecology, this thesis seeks to give voice to those social groups who have been marginalised or whose voices have remained relatively unheard in UK based academia to date.

Industry analysts, media commentators, grassroots and civil society groupings, local communities, non-governmental organisations, filmmakers – all of these have directed critical shots at the dominant shale gas discourse presented to the public by central government and corporate actors. The efforts of these people to stand up to powerful interests who stand to gain financially from UK shale gas is in the spirit of democratic participation, debate, and environmental justice. This mirrors political ecology’s focus on seeking to right wrongs, to expose injustices, and to hold powerful interests to account. It is my hope that this thesis can add to this body of thought and practice and influence this debate, in some small way.
Research Questions and Aims

The overarching aim of this research is to contribute to the wider political ecology literature on the shifting relationship between nature and society, especially within the strand of political ecology which analyses the idiosyncrasies of environmental conflicts related to extractive resources. The specific aim of this thesis is to explore the politics of shale gas in the UK today through a case study on the frontiers of fracking in North West England, analysing how shale gas is being contested, resisted, negotiated and experienced. The research questions below try to probe more deeply into a political ecology perspective of shale gas in the UK that includes an ethnographic approach to the social side of environmental conflict. At this juncture it is useful to briefly explain what the terms fracking, hydraulic fracturing, and shale gas extraction mean, and state that they will be used interchangeably in this thesis.

Fracking is used in many quarters as shorthand for hydraulic fracturing, which in its modern form is more accurately described by the rather clumsy but nonetheless accurate term of horizontal high-pressure hydraulic fracturing. Neither fracking nor horizontal drilling are new in the terminology or practices of the oil and gas industry, but the combination of these two techniques and the scale at which they are being utilised to extract gas in settings such as the US are indeed new. In his recent book on the topic, Prud’homme (2014) notes that different people define fracking in different ways. He prefers a broader definition that recognises the word fracking as a descriptor for “all the steps used to prepare a well, drill it vertically and horizontally, inject the fluid, recover hydrocarbons, and remediate the waste” (ibid:24). This definition is a useful one as it highlights all the steps of drilling a shale gas well, including the requirement to process hazardous wastes. Fracking can be thought of as a combination of specialised technical processes that have made the recovery of hydrocarbons stored in shale rock possible – and in a wider context of dwindling sources of fossil fuels accessed by conventional drilling into subsurface oil and gas reservoirs – economically viable.

This research has been a highly qualitative endeavour which actively seeks to shed light and attention onto the human experience of an ongoing environmental conflict in an advanced capitalist country, and a conflict that looks set to continue for some years to come. I closely followed the UK shale gas debate online via traditional media outlets and commentators, as well as monitoring less well known online publications through social media channels. Parallel to this, I conducted an in-depth review of the ever-growing body of literature on shale gas and fracking drawn mainly from the social but also the natural sciences. After conducting this exercise I was drawn to several research questions. These are as follows:

1– How are different social groups - local communities, grassroots civil society organisations and established NGOs - contesting unconventional energy in North West England?

2– How have the lives of people living in North West England already been impacted by the UK government’s decision to pursue shale gas extraction?

3– What are the implications of shale gas extraction for ‘landscapes’, both in a material physical-spatial sense and in discursive struggles over meaning?

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7 This can be found in Chapter III.
Coming from an academic background combining political science and geography, I have been drawn to questions that aim to enhance our understanding of the social phenomena that this conflict has produced. I wanted to understand more about how people are experiencing something that raises the prospect of profound transformation in the physical and social geographies of the landscapes in which they live and work. To me, power appears central to understanding how this conflict is being played out.

The first research question probes into how shale gas extraction is being scrutinised by different non-state groupings. They are engaged in campaigning and advocacy and often resort to public protest – not always legitimate in the eyes of the legal authorities – alongside raising objections to shale gas through the local planning system and parliamentary representatives. This part of the research aims to generate a picture of how these groups interact with each other and what motivates them to contest shale gas in North West England. At the outset of this research the intention was to interview those on both sides of this conflict – pro and anti. However, due to limitations encountered during fieldwork (described later in this section) I was unable to incorporate pro shale gas perspectives into the analysis from individual interviewees. Interactions with the pro-shale gas camp at conferences and events have given this research a flavour of this side of the argument, and it is highly likely that the positions stated publicly in such fora would have been regurgitated in a one-on-one interview. Thus, this thesis does account for both sides of the argument but at differing depths, with a stronger focus on the anti shale gas camp.

The second research question takes a more ethnographic approach to shed light onto how the recent shale gas activity has impacted on people’s lives in Lancashire. This part of the research centres on my interviews with people in a Lancashire hamlet earmarked as one of the first three-year hydraulic fracturing multi-well test sites. I wanted to examine how the drilling that has occurred to date in the region, and the planned future drilling, was impacting on people’s lives and the dynamics of their communities. How local opposition and resistance connect-up with regional and national civil society groupings was something I wanted to explore. I was also interested to find out how some people who look set to live with the consequences of a shale gas industry on their doorsteps can see it as a positive change, which can provide jobs, supply-chain opportunities, and other economic multiplier effects for their communities. Recent scholarly analysis taking an explicitly anthropological perspective on fracking in the US and Australia has produced a number of insightful studies that provide a human angle to shale gas extraction (de Rijke 2013a, 2013b; Pearson 2013; Willow 2014; Willow et al. 2014). This angle is often neglected in heavily scientific papers written by physical geographers and geologists (Howarth et al. 2011; Myers 2012).

The final research question reflects an observation by this researcher that ‘landscape’ is a pivotal node in this conflict, connecting the biotic surface and the abiotic subsurface, and one that reflects how the social is no longer only part of activities at the surface level. Landscape is a physical assemblage bound-up in the politics of the aesthetic (Benediktsson 2007). It is also about perceptions, values and shared (or different) environmental histories in particular geographical settings. This component of the research seeks to explore at a theoretical and practical level how differing conceptions of how a landscape ought to look and function connects to shale gas
extraction in the UK. This entails a consideration of the environmental and economic history of NW England and how it intersects with the shale gas debate today. How does being the historical birthplace of the industrial revolution, as well as a region noted for its more recent history of industrial production and mineral extraction, produce conditions for a spectrum of social actors to disagree about the necessity for shale gas?

**Research Methods**

After a preparatory period spent reading background literature, refining methods and approaches and organising logistical matters, I spent a period of six weeks ‘in the field’. This part of the study involved travelling to rural and urban locations across North West England in the counties of Lancashire, Greater Manchester, Cheshire and Merseyside. Manchester acted as my hub city due to favourable transport connections and the proximity of a large number of grassroots anti-fracking organisations and the protest camp at Baron Moss – all a short train journey away.

Walker (2006:384) points out how scholarship that falls under the label of political ecology is highly diverse in its epistemologies, objectives and methods. The field is known for novel combinations of quantitative and qualitative methods, however this research is limited to being purely qualitative in nature. Over the course of the fieldwork I conducted semi-structured interviews with 13 participants drawn from different groups contesting and resisting shale gas in the North West. Interviewees included residents living adjacent to a proposed drill pad, grassroots community groups, established regional NGOs, and a member of the UK parliament from a constituency in Greater Manchester. As explained later in this section I was unable to secure interviews with any individuals who were overtly pro-shale gas from government or industry, though I did encounter a variety of shades of opinion amongst my interviewees – some of whom were tentatively pro-shale gas.

Interview questions were developed and clustered thematically under the three research questions. These were designed to draw out understanding of the experiences and perspectives of those interviewed. The nature of semi-structured interviews is such that commonly not every question is posed to every single interviewee in a robotic fashion, but rather that interviews are focused around core themes and when potential insights are uncovered respondents are encouraged to speak freely and in greater detail about a particular point. Clearly, this may raise questions concerning the reproducibility of this research yet I felt it was the best way to generate meaningful material and in keeping with the traditions of qualitative research. Rather than attempting to build any general theory of how social actors interact in spheres of contestation, this research will explicitly look into the “idiosyncrasies, contextual outcomes, and local surprises” (Robbins 2012: 84) that can aid in developing a deeper understanding of shale gas in North West England.

A sampling strategy guided the identification of interviewees. Over the course of securing interviews a conscious effort was made to identify and speak with a sample of people that was gender balanced, drawn from a variety of ages, and from different

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8 For a map of North West England and the Bowland Shale refer to Figure 2. For a map of fieldwork locations refer to Figure 3.
shades of the political spectrum. I contacted key prospective interviewees by e-mail, some of whom agreed in principle to meet me in advance of the fieldwork commencing. Other interviewees were secured through the method of ‘snowballing’ (Valentine 2005:117). These contacts were generated through the attendance at events in the initial weeks of the fieldwork, and the conversations struck up there put me into contact with a network of people who in turn put me in touch with other individuals engaged with shale gas in the North West. The relationships that developed from these encounters generated layers of different contacts and a pool of people to potentially speak with in formal interviewees, or converse with in informal dialogues. I chose to conduct 11 separate interviews, two of which were with pairs of people. During these interviews I took notes and recorded them using the microphone on a smartphone so I could re-listen to them when thinking through and writing-up my findings section. The profiles of the interviewees are presented in Appendix 1. These profiles give information about these individuals’ professional or activist affiliations, gender, and when the interview took place.

One complicating factor which arises when conducting interviews of this nature is that giving voice to particular groups through the medium of a thesis like this necessarily means that some voices and narratives get side-lined or even silenced in the process of choosing who to talk to. Who represents the ‘true’ voice of a local resident or of a grassroots activist? Equally who is a ‘campaigner’ or a ‘resident’, and do the categories chosen represent the people I met and assigned to them? Beyond this individual piece of work, one must reflect on who is not being heard in the conflict over shale gas in the UK. This epistemological drawback is something that cannot be solved here other than by making readers aware of it and making them conscious that the perspectives presented in this thesis capture but a snapshot of a complex social process. Naturally, a significant effort was made to represent this controversy in a balanced manner, dealing chiefly with what I as a researcher witnessed during my fieldwork.

A process of participant observation complimented the interviews. This was conducted in the tradition of ethnographic research where I as a researcher sought to “watch, listen, and learn” (Berg 2001: 155) from those on both sides of the debate to collect and connect thoughts and ideas. I observed many interactions, which served to complement the interviews and enable me to derive additional meanings and insights not uncovered in an interview setting. Practically, this involved informal interactions with the people I became acquainted with as well as the attendance at meetings, debates and conferences. A full list of events attended can be found in Appendix 2. They included visits to two protest camps, three high-profile shale gas industry conferences (such as the one pictured in Figure 1), attendance at community meetings, a community-run activist skill sharing event, and an elections hustings event at which local political candidates debated fracking in the UK. Throughout this process I paid attention to how people organise politically and how they relate to nature and speak about the landscapes that they are part of. Elements of these observations form part of the findings, however the findings are more heavily weighted towards a presentation of the interviews.
From the outset, efforts were made to engage with and speak to those who support and advocate shale gas for the UK. This centred on representatives from the various corporate entities that make up ‘the industry’ connected to shale gas, who at this stage are the drilling companies holding petroleum exploration and development (PEDL) licences in prospective drilling zones atop gas-rich shales. In the North West, two companies are particularly important in this regard. ‘Cuadrilla Resources’ who currently hold PEDL licences across much of Lancashire, and ‘IGas’ who hold them in parts of Greater Manchester, Merseyside and Cheshire. Cuadrilla refused an interview with me on the grounds they were too busy preparing their planning applications for their two upcoming drilling sites in Lancashire. IGas neglected to respond despite repeated follow-up emails. Several Lancashire county councillors who have publicly spoken out in favour of shale gas development were contacted and either failed to reply or declined an interview.

Therefore, disappointingly, I was unable to realise my original intention of securing interviews with individuals drawn from across the spectrum of opinion about shale gas in the UK. Some adjustments were made in the draft approach and research questions to accommodate this. On reflection, I feel that this turn of events did not negatively affect the study to a great extent. Through my attendance at several major conferences I gained insights into the thinking and workings of the industry especially in relation to regulation, public trust and confidence building, and the practicalities of their future drilling plans. I also gained an awareness of how these firms maintain well-polished public relations arms, and strongly suspect that these arms – rather than more senior management personnel – would have been the point of contact for any student interview.
Case Study Area

I chose to site this research in North West England, within the shale formation known as the Bowland Shale (Figure 2). The rationale for choosing this as the geographical case study was two-fold. Firstly, Lancashire has the longest experience with unconventional energy in the UK dating back to a series of test wells in 2011, one of which was hydraulically fractured before operations were suspended due to earth tremors which were later proven to be a result of fracturing in a geological fault. In the intervening years a well-formed set of civil society organisations resisting the process has emerged, made-up of citizens who have a longer personal history with the arguments for and against hydraulic fracturing than people in other shale gas rich parts of the UK. This is due to the emergence of the first UK shale gas well to be hydraulically fractured in Lancashire in 2011, and several other test wells in the intervening years. Controversially, this first well caused minor earth tremors forcing it to be closed and a temporary nationwide moratorium placed on hydraulic fracturing whilst investigations were undertaken.

These citizens have engaged in various forms of political action including demonstrations, blockades, rallies, debating fora, and protest camps. Cuadrilla and IGas have maintained a presence in the region. Secondly, as identified in a major British Geological Survey (BGS) report covering Northern England (Andrews 2013), estimates suggest that this shale formation holds a vast quantity of gas within its rocks and thus considerable interest has been generated in the potential gas resource held under the landscape of this region. Currently, in the Fylde region in Western Lancashire there are two sites under consideration by the planning authorities to be the first UK shale gas exploration well pads that will use the technique of hydraulic fracturing for a three-year period. The North West is the true frontier of fracking in the UK, and this is why it is especially well suited to an analysis of the present situation.

Shale rich geological formations cover other parts of England and Scotland. A recent report released by DECC and the BGS (Andrews 2014) looked at the so-called Jurassic Basin which stretches across parts of Sussex, Kent, Hampshire and Greater London. In the summer of 2013, Sussex, south of London, was the scene of a vocal and headline grabbing anti-fracking protest camp at the village of Balcombe. Due to time constraints, I decided to delimit this study to focus purely on the Bowland Shale area in the North West. Within this area, I considered narrowing the study further to focus on a particular site but I felt this was unworkable as the scattered patchwork of locations for exploratory drilling work are all at varying stages of development. This part of England is home to the most sizable section of shale rock in the UK and home to residents who appear set to become the first in the UK that will have to live with the consequences of a shale gas industry. Capturing their views, their experiences, and their voices is critical as the UK moves ever closer towards production.
This thesis has been limited to 18 weeks of full-time study including six weeks of fieldwork. Consequently, for reasons of brevity there are some important elements of the UK shale gas debate that this investigation will only touch upon, or disregard completely. These include: water stresses, wastewater treatment; the changing nature of subsurface property rights; the policing of environmental protest and the criminalisation of dissent; and technological and policy alternatives to shale gas extraction. The shale gas debate in the UK, is, as elsewhere, wide-ranging, involving many individuals and organisations with a variety of perspectives and connecting to a great many other important socio-political debates.

Challenges

All research throws up challenges and potential pitfalls that a researcher must be aware of and react and reflect upon. Besides the difficulty of sourcing pro shale gas interviewees as already explained, one particular element that I grappled with is that this is a study of an ongoing environmental conflict. Shale gas in the UK is taking place within an evolving policy environment connected to the priorities of the incumbent government administration and the longer-term challenges of decarbonising the UK energy system. No hydraulic fracturing was actually taking place at the time of the fieldwork. The scholarly work produced to date – largely in the US – has for the most part analysed changes that have taken place as a consequence of the widespread development of unconventional energy. The UK is not at that stage yet. Therefore any academic investigation must contend with the difficulties of not being able to measure or analyse quantitative changes in relation to some definable pre-extraction state, both in relation to the physical geology and geography, and the socio-cultural context.

9 http://www.bgs.ac.uk/research/energy/shaleGas/images/presentation/bowlandShale.jpg
However, I do not feel this was an obstacle to conducting a meaningful investigation. Fracking has been on the horizon in the UK since the first well was drilled in 2011 and since then the amount of people involved in political action related to this area has ballooned significantly. An attempt to try to sketch out the unexpected political effects that have resulted from the UK’s experience with fracking so far has the opportunity to influence ongoing debates and position itself in line with environmentally just and sustainable pathways. A recent House of Lords (2014:86) report notes that “despite the optimism of the Prime Minister and other Ministers about the prospects for shale gas, at the current pace of development large-scale production is unlikely until well after 2020.” Evidently the shale gas debate looks set to continue for some years to come.

I am of the view that geographers – and other social scientists – ought not wait until production has begun before analysing the effects of shale gas. Thus this thesis stands as an analysis purely of the ongoing environmental conflict over fracking in the UK, using the North West as a case study to illuminate many issues and debates that are present nationally.

Another challenge that became increasingly apparent over the course of conducting the literature review for this thesis is that virtually all research into this politically charged topic is open to charges of (and sometimes tainted by) conflicts of interest. Many government and corporate funded studies (Royal Society 2012; EY 2014) are highly criticised by the anti shale gas camp, and vice versa. In my view, the most trusted conduit from which to publish untainted research in to shale gas is academia.

That said, academic geology is regrettably not immune to such accusations, particularly in the geosciences departments of UK (and US) universities. For instance, the Researching Fracking in Europe (ReFINE) research centre at the University of Durham is a unique and much needed centre specialising on high-quality research into shale gas. However, rightly or wrongly, it is open to accusations of bias from the simple association of its head, Richard Davies, with the oil and gas industry. These concealed associations make it hard for both the specialist and the lay reader to get a sense of whether they are being presented with ‘the facts’ about shale gas (or not), cultivating distrust towards academia.

Tellingly, as remarked by a presenter at a conference organised by the Institute for Engineering and Technology (IET), it is difficult to find anyone in the UK with specialist knowledge of geology and the oil and gas sector who has not worked for industry in some capacity. That being said, no researcher can also claim to be a completely empty vessel devoid of their own unique prism through which they see the world. Thus it would be wrong to claim some sort of faux impartiality from the pedestal of academia. The results of academic social science research are a product of a researchers background and experiences, and laden with their unconscious biases. In this thesis it was my objective to approach fracking with an open mind. I have listened in detail to what those from all points along the spectrum of opinion have to say about it and have formed my own opinions and analysis on the basis of what I have read and heard. As my interviews have focused on the opponents and critics of shale gas extraction it is their voices that are heard most in this piece of work.

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10 See: https://www.dur.ac.uk/refine/people/
The final challenge has been that this thesis is a piece of work grounded in a highly specific socio-political context. Therefore it is doubtful whether the results will be generalisable in any way. It is my modest hope that this work can shed some new light onto the nature of conflicts over shale gas and unconventional energy which readers in similar contexts may find insightful and useful. The way the shale gas discourse has been evolving in the UK has displayed a mixture of similarities and differences with the US experience as documented in the academic literature and in documentary film. With large and proven shale gas reserves in many other countries, many different scenarios are possible for shale gas’s growth at the global scale. How many or to what extent these countries will attempt to mimic a US (or UK) style shale gas revolution remains to be seen.

III. Literature Review and Theoretical Framework

This section examines the current state of the academic literature relevant for this study. After defining some of the key concepts used in unconventional energy discourses, it traces the historical trajectory of modern-day fracking as a method of fossil fuel extraction by looking at its evolution in other settings around the world. Second, this section connects the unique environmental history of North West England, as a region with strong ties to industrial production and extraction, to contemporary issues around decarbonisation and the energy ‘trilemma’. Next, it reviews the growing body of literature in political ecology that focuses its gaze on the emergent dynamics of unconventional energy extraction in the Global North. Finally, it reviews the geographical literature that examines the concept of landscape within political ecology, especially as it relates to transformational energy technologies and theories of the subsurface.

To understand the ongoing conflict that has erupted over fracking for shale gas in the UK it is necessary to consider the wider political economy of energy in an age of depleting conventional fossil fuel sources. Since the start of the industrial age, capitalist economies have depended upon an abundance of fossil fuel resources to drive production and create wealth. Today there exists a simultaneous recognition of the increasing scarcity of these non-renewable energy sources, coupled with an acknowledgment that to address anthropogenic climate change a transition to a more renewable energy system is urgently required and that many of the remaining sources of fossil fuels be left underground.

Hydraulic Fracturing, Shale Gas, and Unconventional Energy

Unconventional oil and gas has emerged as a major new global energy source. It is useful at the outset of this section to provide some conceptual clarity for readers who may be less familiar with the technical terms used in the unconventional energy literature. Unconventional energy is a term that has come to describe a collection of new technologies and techniques for extracting hydrocarbon energy reserves. Many of the techniques – such as fracking – are not completely new; they have evolved during

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11 Notably in China, Brazil and France
recent decades. What is new is the scale at which they are being utilised in some locations today and concerns about the concomitant environmental impacts such operations will have on human populations and landscapes with the construction of “well pads, pipelines, compressor stations, processing plants, new roads, and water treatment facilities” (de Rijke 2013a:13). Recognising the increasing normalisation of these new energy technologies, the International Energy Agency (IEA) points out\(^\text{12}\) that the two categories of ‘conventional’ and ‘unconventional’ do not remain fixed over time. Technologies once considered unconventional can become commonplace and migrate into the conventional category. That said, these two broad categorisations serve to distinguish between the more novel contemporary forms of hydrocarbon extraction and extraction methods and those that came before. Besides hydraulic fracturing for shale oil and gas, Kitchen (2014) identifies how unconventional energy refers to other extraction techniques such as: underground coal gasification, coal-bed methane extraction, the extraction of oil from tar sands, deep-water offshore drilling, and, the drilling for oil and gas at high latitudes, chiefly in the Arctic Circle.

The US and Australia are the only countries that have so far experienced a significant boom in unconventional energy extraction, chiefly from shale oil and gas. Despite the clear financial and energy security benefits that shale gas has afforded these countries, an ever-growing body of empirical US-based studies in the domain of public healthcare have looked into the potential dangers of this processes. McKenzie et al. (2014) have documented an increased prevalence of birth defects in babies born near to shale gas extraction drilling pads. Meanwhile, Bunch et. al. (2013), found that in Texas, airborne volatile organic compounds have not been raised to dangerous levels despite significant numbers of shale gas wells. No consensus has yet emerged in the field of public health on precisely what the risks to human health from fracking are, or how the practice can be adequately regulated or modified to fully mitigate any such risks. Indeed, as Lave & Lutz (2014: 739) point out in a recent meta-review of the physical and social science literature on fracking, “the physical science literature on fracking remains remarkably inconclusive”.

Research into social phenomena resulting from the rapid expansion of the US shale gas industry has also produced a number of insightful analyses. This has included a focus on: legal geographies (Andrews & McCarthy 2013), neo-liberalisation and water resources (Finewood & Stroup 2012), landscape contestations (Danza 2012; Willow et. at. 2014), and the case of ‘frac sand’ mining, a key raw material in the drilling process (Pearson 2013). In the US, fracking has penetrated into the mass media with highly publicised anti-fracking documentaries (Gasland 2010; Gasland 2 2013) and rebuttal counter-documentaries (FrackNation 2013) bringing the complex trade-offs involved in charting a course with unconventional energy to the wider American public and a global audience beyond. The wider online dissemination of these documentaries, and Gasland’s portrayal in particular of the damaging consequences resulting from shale gas extraction in particular has been critical in informing some UK based activists on the purported negative effects of shale gas drilling operations. This was highly evident during the fieldwork.

In Australia, Coal Bed Methane (CBM) – or ‘Coal Seam Gas’ as it is often called locally – exists below large swathes of the Australian countryside. Writing about the

several thousand wells that have been constructed in Queensland, de Rijke (2013b) describes the ongoing contestation of these practices by certain residents who farm the highly fertile soils of this area as an “agri-gas conflict”. Australia is a vast country with a relatively small population yet there is a scarcity of high-quality farmland to sustain agricultural production. The government’s decision to pursue unconventional energy extraction in these areas has created tensions between farmers and the gas companies, whose operations risk releasing hazardous chemicals into valuable agricultural soils. Mercer et al. (2014:295), in a revealing analysis, found considerable discursive consistency between the Queensland government and the drilling companies, both of whose public statements serve to normalise the position of neoliberal economic ideas whilst side-lining the alternative discourses of those contesting extraction. Finally here, a recent PhD thesis which analysis the scalar politics of water in South Africa (Ramasar 2014) examines the nascent shale gas industry in the country. Like the UK, exploratory drilling is being conducted in the country and the author argues that shale gas is currently framed by economic elites as being in the national economic interest and couched in the terms of neoliberalism (ibid: 116).

In the UK, Selley (2012:105) traces the origins of the country’s first encounter with shale gas back to 1875 when a group of academics, investigating the depths of rock in the Weald13, found shale gas there as well. However, the history of shale gas production using modern technology is altogether more recent and centres chiefly on two counties – Lancashire and Sussex. Situated in North West England, Lancashire possesses the longest history of prospecting for gas rich shales. Though this history is short. It began in 2011 when Cuadrilla, the first UK shale gas drilling company, conducted exploratory drilling at several sites in Lancashire, one of which was hydraulically fractured. After low levels of seismic activity were detected at this site, hydraulic fracturing operations in the UK were placed under moratorium (DECC 2014b:2). Today, with this moratorium now lifted and new operational guidelines related to seismic risks put into place, several new sites are earmarked in Lancashire to become the UK’s first three-year exploratory drill pads. Planning consent is currently being sought at sites near to Preston New Road14 and Roseacre Wood15, both located in the Flyde peninsula on the Bowland Shale. Full-scale extraction of shale gas has not begun in the UK but it is in the early steps of a long road, with a domestic onshore extractive industry the ultimate goal. Yet, the test drilling that has taken place and the rhetoric emanating from government has stirred a polarised public debate and witnessed the emergence of campaigns by a range of different civil society groupings fighting against the government’s intention to push ahead with a “dash for shale gas”16.

From Industrial Revolution to the Energy ‘Trilemma’

At this point it is useful to take a cursory look backwards from the quarrels of the present day to delve into the environmental history of North West England and give some context for what is happening today. Indeed, political ecology places importance

13 The Weald is an area in South East England crossing the counties of Sussex, Hampshire, Kent and Surrey.
14 Available at: http://planningregister.lancashire.gov.uk/planappdisp.aspx?recno=6586
15 Available at: http://planningregister.lancashire.gov.uk/PlanAppDisp.aspx?recno=6591
16 The ‘No Dash for Gas’ and ‘Reclaim the Power’ campaigns are national-level anti-fracking and energy justice campaigns. For more information see: http://www.nodashforgas.org.uk/
on taking a historical perspective when examining contemporary environmental issues. The counties of North West England hold a unique place in the history of the British Isles and the wider western world; for it was in Manchester and other Lancashire towns in the early 1800’s that the industrial modes of manufacturing emerged and took form. Textiles were a key productive sector and many of the ‘cotton towns’ that peppered the landscape across much of Southern Lancashire still exist today, albeit without the cotton mills spinning as they once did. As well as being an innovative manufacturing base, the extractive industries have been a feature of the landscapes of the North West. The mining of coal and salt were major factors in the industrial growth of the region at that time (Ashmore 1982:1). With a favourable geology for the extraction of coal, mining was prevalent here well into the second half of the twenty-first century, forming a significant proportion of the regions economic output. The inland port at Salford along the Manchester ship canal together with the docks at Liverpool served as gateways to international markets for the goods produced here. This is a region steeped with a proud industrial heritage.

However, global economic forces meant that ‘the workshop of the world’ was compelled to reinvent itself from the 1920s onwards (Winchester 2006:227). Manchester, the regions former industrial centre, has transformed itself into a modern city with a primarily service led economy, yet the remnants of its industrial past are there for all to witness in the splendid redbrick warehouses and chimneystacks that have been preserved across the city. Since the end of the World War II, industry and manufacturing has profoundly declined across the entire UK (Pryor 2010:626). Today, in stark contrast to previous eras of abundant fossil fuel resources, the UK faces what has been called the energy “trilemma” (DECC 2014a). The UK energy system is facing up to a number of challenges. These are three-pronged: how to make the energy system (i) more secure, (ii) more affordable, and (ii) more sustainable (DECC 2014a:4). Dwindling domestic energy supplies and decades of underinvestment in the energy infrastructure, combined with international commitments to decarbonise the energy system have all led to this policy scenario. All three of these challenges have been used as arguments and counter arguments for developing a shale gas industry in the UK.

In the wake of dwindling North Sea gas supplies, and given the UK’s increased reliance upon Russia and other foreign nations (notably Norway and Qatar) for its gas supplies, political leaders have used this dependence as a rationale for the development of new domestic sources of gas (House of Lords 2014:17). This argument has found fertile ground considering the tumultuous geopolitical relations between Western countries and Russia throughout 2014 with the continued conflict in Eastern Ukraine. Sustainability and climate change are also big issues. Supporters of shale see it as a short-term ‘bridge fuel’ to reduce our dependence on coal and help reduce carbon emissions, as gas produces less emissions when compared to coal. Opponents argue that shale gas is distortionary for policies that aim to cultivate a genuine low-carbon energy system based on renewables, diverting attention away from this larger and longer term task and undermining private sector investment in renewable technologies. They also cite evidence from the US (Howarth et al. 2011) that shale gas extraction releases ‘fugitive’ methane into the atmosphere, a greenhouse gas far more potent than carbon dioxide.
Shale gas does not look likely to disappear from UK energy policy discourse any time soon. The British Geological Survey has revised its estimates of UK shale gas supplies upwards from 5.3 trillion cubic feet (2010) to 1,300-1,700 trillion cubic feet (2013) (Gu & Nazmy 2014:5). Whilst the portion of this gas that is technically recoverable is far smaller (around 5-10%), with such huge volumes of gas available the debate about shale gas looks set to continue for a number of years to come.

A Political Ecology of Environmental Conflict

Political ecology is an eclectic sub-field of geographical research that draws on a range of related disciplines to try to understand the process of environmental change. It is a mode of analysis and a way of approaching environmental politics. As Blaikie & Brookfield (1987:17) put it in their foundational text: “political ecology combines the concerns of ecology and a broadly defined political economy. Together this encompasses the constantly shifting dialectic between society and land-based resources, and also within classes and groups within society itself.” That political ecology has something worthwhile to add to the analysis and understanding of environmental conflicts is a sentiment echoed by several eminent scholars in the discipline (notably: Peet & Watts 2005; Neumann 2005; and Robbins 2012). Overwhelmingly, political ecologists to date have tended to examine the inequities and power imbalances of land and resource conflicts in the countries of the Global South. For example, just one of the case studies in Zimmerer & Basset’s (2003) collection of political ecology case studies comes from outside the countries of the Global South. Similarly, Peet et al. (2011) focus the majority of their more recent volume on cases from similar countries.

That said, over the last decade there has been a clear increase in political ecology studies focusing on the Global North. A cohort of scholars (Nesbitt & Weiner 2001; McCarthy 2002; Walker & Fortmann 2003; Walker 2003; Schroeder 2005; Schroeder et al. 2006) view political ecology as highly suited to the analysis of the politics of nature in the advanced capitalist countries of the Global North. In their work, these authors all elucidate broad political ecological themes that bear direct resemblance to cases in such countries. These include: access to and control over resources; scales of analysis; the primacy of local meanings, culture, and histories; ill-defined property rights; and, the disempowerment and disenfranchisement of local resource users. McCarthy (2002:1283) emphatically argues that it is the presence of these themes in case studies, be them in the Global North or the Global South, rather than any consistent theoretical or methodological approach to them that glues together and defines the field of political ecology.

Wherever they may be in the world, environmental struggles and conflicts often pit rich against poor and involve the fundamental questioning of capitalistic economic models (Escobar 2006:7). Thus, political ecology has proved a useful theoretical tool for some scholars in recent years to analyse the socio-political frictions and changes resulting from the boom in unconventional energy. Finewood & Stroup (2012) examine the discursive framings at work in Pennsylvania’s Marcellus shale play, a stretch of gas-rich shale rock underlying a large section of the North-Eastern US. They argue that neoliberal framings of water resources by oil and gas firms fundamentally alter the ways in which a resource like water is viewed at different scales, becoming rationalised into the discourse of cost-benefit analysis that discards non-economic
valuations of nature. Their analysis is swiping and connects the operation of neoliberal power at multiple levels. One key thread that chimes in with the findings contained in section IV of this thesis is that of claims on scientific knowledge. “Communities must make land use decisions based on incomplete and competing forms of knowledge” (Finewood & Stroup 2012: 77). The sheer invisibility of fracking as a process, and the ability of oil and gas companies to control the flow of information about the underground wells they are operating means it is difficult, in the absence of strong impartial regulatory structures, for residents and concerned citizens to obtain untainted information about what is going on under the surface.

Meanwhile, Andrews & McCarthy (2013), who also utilise a political ecology framework, focus on the ‘legal geographies’ of shale gas development in Pennsylvania. Here, like in the UK, there is a vocal and well-organised civil society apparatus contesting fracking. These authors argue that laws, regulations, and policies are the critical ‘space’ that allows the extractive industries to operate, and that the tacit and informal dynamics of these spaces are key to understanding how power operates in modern-day fracking (Andrews & McCarthy 2013:2). For an analysis of the emergent shale gas sector in the UK, shedding light on the importance of how the laws and regulations are related to the policy arena is helpful. One of the core topics in the UK debate revolves around how a shale gas sector could (and ought to) be regulated in order to fundamentally safeguard human and environmental health. The UK is seeking to mimic the US shale gas revolution in terms of the economic and energy security benefits it has generated, yet there is a desire to avoid mimicking the lax environmental regulations that were enforced in the US, and instead ensure that appropriate and rigorous regulatory structures are in place that can assuage the concerns of campaigners and residents fearful of risks and industry malpractice. This policy or regulatory ‘space’ is still being pieced together in the UK, with The Royal Society (2012) setting out key regulatory requirements, while campaigners argue that these are either inadequate or still need to be more suitable and tailored for the shale gas industry.

For me, what holds together many of the political and geographical ideas being explored in much of the literature above is the concept of landscape. The political ecology of landscape is inextricably connected to the processes taking place through the fracturing of the geology at a particular place. On the surface, the infrastructure of shale gas extraction is comprised of drilling pads, access roads, and large numbers of vehicle movements to bring equipment and fluids to a site. The surface is connected to the subsurface through aquifers, the water table and various geological fault lines. Any disturbance that releases hazardous material into the subterranean environment can have impacts on the surface ecology above by introducing foreign chemicals to the biotic environment. This can happen immediately or occur many years or decades after drilling has taken place as fluids migrate through the subsurface. It is to the idea and literature about landscape that this section now turns.

**Landscapes of Contestation and Risk**

In common parlance the term landscape conjures up images of the scenic, of the aesthetic, of the visual. In rural England this typically equates to the rolling natural topography of countryside terrain and picturesque villages nestled within. For many of those concerned about shale gas extraction, the ‘landscape impacts’ of the process are
rooted in the notion of some particular image of ‘the rural’ and ‘the natural’ of English rural landscapes. The manmade machinery of extractive technologies is viewed as a threat, not just to this pastoral aesthetic but also to the meaning of landscape itself. In this section I will review the core political ecology texts to engage with landscape and environmental conflict.

The broader corpus of environmental change literature has a long history of engaging with the concept of landscape. Neumann (2011) charts out this history and explains how authors from other strands of geography and landscape studies have used the term. In political ecology, he highlights how many studies have shed light on the material aspects of landscapes by employing the binary framework of consumption versus production landscapes. Landscapes are “conceptualized as falling into two distinct categories, which are linked to changes in the political economy of natural resource exploitation and conservation” (Neumann 2011: 845). Such a conception highlights how the physical qualities of a landscape are viewed and used by people in different ways. Neumann goes on to argue that “landscapes as contested nature, as struggles over meaning, are simultaneously struggles over social identity, belonging and exclusion, and land rights and use” (ibid:845). He sees environmental conflict over a landscape setting as a prism through which one can simultaneously observe contestations over meanings, rights and identities.

Walker & Fortmann (2003) provide an illustrative paper in this strand of literature. It examines who gets to define what a landscape ought to look like. They document a conflict between wealthy migrants and poorer longer-term residents in the Sierra Nevada Mountains of the US, where tensions emerged between the former valuing the ‘aesthetic’ consumption of natural rural landscapes versus the latter who depended on and fought for ‘traditional’ production landscapes where nature is viewed as inseparable from livelihood necessities. The case presented in their paper highlights a deep politicisation of landscapes, amplified when fast-paced environmental change is anticipated or occurring in a location. They argue that “no single, shared vision of the landscape” existed in the Sierra Nevada, a place where people possess heterogeneous incomes, values, and identities (Walker & Fortmann 2003: 482). Here, landscape is an idea about how terrestrial land surfaces should be used, and an idea that differs between different groups of people.

Writing about shale gas development in Ohio, Willow et al. (2014) explore the contested landscapes of unconventional energy developments. By means of a qualitative ethnographic study they assess how shale gas extraction has changed residents understanding of the environment around them. For these authors, landscape is a “cultural phenomenon” (Willow et al. 2014: 2). Rather than being purely an external aesthetic, it is bound up with how people think and feel when they experience the natural world around them. Within the social groups these authors examined – grassroots activists, NGOs, government agents, and industry (via documentation) – they found highly divergent attitudes concerning how people relate to the natural world. They identified those who see themselves as environmental stewards and protectors, and others who see the natural environment as a realm of opportunity for financial enrichment (ibid: 8). In this example, landscapes are being shaped by the interactions of social actors who possess incommensurable notions of nature-society relationships. The wide and rapid spread of the shale gas industry in the US has been contoured by a number of factors, and one of these is the dominance of a way of
looking at the natural world as an arena for profit making activities emanating from powerful social groups with interests in drilling for gas. The dominance of such an outlook has occurred at the expense of a more empowering dialogue that allows rural communities to shape the outcomes of the changes taking place in the places they live in.

In an additional comparative study (Willow 2014), the author draws parallels between the Ohio case and that of a remote Canadian community engaged in conflict over industrial logging activity. In so doing Willow attempts to make a more general point about the features of the “new politics of environmental degradation” (Willow 2014: 252) evident in resource conflicts in the Global North. These are characterised by an ongoing structural shift towards the exposure of relatively privileged social groups in the Global North to industrial activities that bring environmental risks. These activities were not approved of, nor did communities derive benefits from them. What is it that connects landscapes to the changes implicated by the extraction of shale gas? There are the physical modifications that are required, but these are similar, if not fewer, than the physical modifications that result from renewable energy technologies such as wind and solar, both of which require the cover of large tracts of land (or sea). Shale gas extraction is more about the imposition of a new fossil fuel industry into contexts where previously there had been little industrial activity, occurring in such a way that it hops around a shale rock rich region. Danza (2012), in one of the most thought-provoking papers written to date on landscape and shale gas in the US, argues for a focus on the resource itself and how it “is known and imagined: either as productive of economic possibility or destructive of lifestyle and landscape” (ibid: 6). He views landscape in primarily discursive terms.

The examples so far in this section have treated landscape and political ecology in the settings of the Global North with questions related to landscape meanings and how conflict can erupt when different population groups view landscapes - and nature more generally – in different ways. However, beyond this theoretical strand in the political ecology literature that looks into landscape meanings, there is also a core of geographers who have analysed the role and the implications of physical-spatial transformations to the energy landscape. The relationship between landscapes and new energy technologies has been thrust into the limelight with the rapid growth of renewable energy forms that have distinct spatial footprints on the landscape. The growth in wind and solar farms has generated antagonism amongst certain quarters of the population for their aesthetic form. Likewise, shale gas has been accused of “industrialising the countryside” with images showing many hundreds of wells peppering rural vistas in the US. Indeed, all forms of energy technologies necessarily impact to some degree on the physical geography and aesthetics of a particular setting, be they fossil fuel, nuclear or renewable technologies. Bridge et al. (2013: 335) note that “whereas location refers to a point in absolute or relative space, ‘landscape’ describes the assemblage of natural and cultural features across a broad space and the history of their production and interaction.” Such a conception of landscape draws attention to the dialectical process of interaction between the natural and the manmade.

When thinking about shale gas and its associated infrastructure, one is conscious of how physical wells and their associated industrial activities will impact spatially on landscapes and thus reconfigure socio-environmental relations in the settings they
occur. Nadaï and Van der Horst (2010:144) examine this ‘landscape-energy’ relationship, and they argue that the low-carbon energy transition is forcing landscapes to “undergo tremendous mutations” continuing along the pathway forged since the times of the industrial revolution, which has resulted in a magnitude of landscape change unprecedented in human history. Anthropogenic climate change is forcing industrial societies to confront the way energy is currently produced, transmitted and consumed. The solutions devised often create significant landscape impacts. However a distinction must be drawn between the acceptability of renewable versus non-renewable energy landscape modifications. Opposition to wind and solar farms has occurred in the UK but the scale of the opposition to the government’s plan to embark on developing shale gas is very different. Here, the concept of risk is paramount.

Technological change such as the proposed energy technologies clustered under the broad category of unconventional energy have political ramifications. Scholarly attempts to understand landscape change and unconventional energy technologies are underscored by a focus on risk as a defining feature of these conflicts. Ulrich Beck’s ‘risk society’ thesis (Beck 1992) is useful in this regard. He sees risk as the defining characteristic of Western democratic polities that have increasingly converged towards a standardised way of mediating capitalist economic relations. As Cooper & Bulmer (2012: 247-249) note, Beck’s conception of the politics of risk identifies the emergence of the “monopolisation of the right to determine acceptable risk by scientific experts” which is “in conflict with the norms of democratic citizenship and the requirements of an open public discourse”.

Scientific experts in positions of power can legitimate discourses of how risky shale gas extraction is. Cooper and Bulmer see the politics of risk and the conflicts that manifest themselves as embodying wider struggles for social power by the antagonised groupings (ibid: 250). The concept of risk has been fruitfully applied in several academic papers on shale gas extraction. Brasier et al. (2013) conducted a quantitative study of risk perceptions of shale gas developments among the residents of the Marcellus shale formation in the US, finding a correlation between high perceptions of risk and distrust of the gas industry. Cartwright (2013: 202), coming from an anthropological background, conceives of ‘eco-risk’ as a way of thinking about connections between subterranean toxic biological processes and social processes. Linking to Beck’s notion of an ever more proliferating risk society, she argues that fracking represents a mode of energy extraction that could expose large numbers of people to deadly risks. Wherever fracking is taking place there are still huge unknowns as to its longer-term impacts on the natural world.

Finally in this section, it is worth noting that within the wider shale gas discourse artistic and diagrammatic landscape representations are a consistent feature, produced by both shale gas drilling companies and activists. Examples from the UK include maps of the Bowland Shale’s depth and extent as well as diagrams explaining the subsurface geology and the drilling process for a non-specialist. These can be found at almost every community meeting and industry presentation. The sheer invisibility of subsurface drilling means that for anyone to understand these procedures they need to enter a world of representation, a world of colourful schema purporting to show how ‘safe’ or how ‘dangerous’ fracking really is. These pictures matter, because they serve as key educational tools for citizens who are uninformed about shale gas. However
these cartographic representations must be treated with an awareness that each one is designed to represent the subsurface landscape to serve specific political ends.

Towards a Political Geology?
As an established sub-field within critical geography, political ecology combines a focus on ecology with an overriding concern to treat political structures, at different scales of analysis, as primary driver of environmental change. This change can be negative in the form of degradation and injustices, or positive in the form of enhancement, regeneration and environmentally just outcomes. Moreover, what is perceived as either negative or positive can differ between people and are not objective facts. Political ecology has evolved to encapsulate a variety of subject matter and borrows methodological tools from other domains in the social and environmental sciences. A central point of focus for the great majority of political ecologists has been biotic resources at the terrestrial surface. But as pointed out by Bebbington (2012), the discipline has tended to neglect the political of subsurface mineral and hydrocarbon resources and their extraction by human agents.

This has changed somewhat in recent years, with several scholarly works that examine different facets of hydrocarbon resources from a broad political ecology standpoint, with recent studies in this area documented extensively by Bebbington (2012:1153). In 2014, a special edition of the Journal of Political Ecology focused solely on hydraulic fracturing. These scholarly contributions were timely. However, as an area of study that has been hitherto relatively under theorised there is presently no agreed common language in which to express this expanding sub-field. Is this underground political ecology, a political ecology of the subsurface or subsoil, or, further still, political geology? This is presently unresolved within the political ecology literature that treats the subsoil as its object of analysis, and indeed some may question whether this matters at all.

The flurry of interest in subsurface resources is mirrored by the recent spread of the term ‘anthropocene’ into the social sciences. This term posits that Earth has entered a wholly new geological epoch and that this has been driven by the activities of humans to modify the geology. In a recent triplet of papers, Castree (2014a; 2014b; 2014c) provides an in-depth historical overview of the origins and evolution of the anthropocene concept and its relevance for the field of geography. He argues that currently the term anthropocene is an “adolescent” one, but that it will quite conceivably mature into a “societal keyword” and could enter the common semantics of wider public discourses as well as being utilised in human and physical geography with increasing frequency (Castree 2014c: 473). The rise of shale gas is but one facet bound up in the rising concern amongst certain academics that human civilisations are marking their impacts onto (and into) the Earth.

In recognising the unique characteristics of subsurface resource conflicts, one does begin to ponder whether ‘political ecology’ itself is an adequate descriptor of what is occurring. In what ways does the subsurface interact with the ecology at the surface above? Does a new and seldom used term – political geology (Yusoff 2013; Bosworth

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17 Papers published as part of this special edition include: Willow & Wylie (2014); Willow (2014); Simonelli (2014); Mercer et al. (2014); Hudgins & Poole (2014); and, Wylie & Albright (2014).
2014) – better serve to theorise and explain these interactions? What makes political geology different from political ecology? I hope to make the argument in the remainder of this thesis that the surface and the subsurface are inextricably linked in contemporary extractives conflicts, and that they exhibit distinct characteristics that warrant the adoption of a new language in which to talk about them.

The next section turns to a presentation of the findings from the fieldwork element of this research, clustered into three sections that follow the ordering of the research questions as set out in the methodology.

IV. Findings

Contesting Shale Gas in North West England

“Fracking Company Dart Energy wants to drill on this land. We’re not going to let them. Join us!”
Placard at the entrance to the Upton Anti-Fracking Camp, Cheshire, April 2014

“I have almost zero confidence in the regulation around this process.”
Interviewee and Member of Parliament, Greater Manchester, May 2014

“Don’t feel like you’re powerless!”
Speaker, Wrea Green Community Fracking Meeting, May 2014

“Do you want these people [fracking protestors] to be your energy advisors for the UK?”
Prof. Peter Styles, North West Energy Task Force Conference, Blackpool, April 2014

Debates between shale gas advocates and shale gas critics on the risks and rewards of allowing the process of hydraulic fracturing to take place in the North West are played out in different settings, some discursive and others physical. In community halls and university debates, at street demonstrations and rallies, and in rural protest camps at some of the proposed shale gas sites, the contestation of shale gas is played out in real-life. This region of England has featured prominently in the national media conversation about shale gas with several of the established test-drill sites provoking strong critics of the process to mobilise opposition. The quotations above stood out from the findings in this section as particularly representative of the perspectives I encountered, making reference to power, public confidence, and protest. This first sub-section of the findings addresses the research question of this thesis that seeks to understand how shale gas is being encountered, contested and opposed in this region.

Protest Camps
Shale gas extraction is being opposed vigorously even at this early stage in the maturation of the industry in the UK. At the time of writing, companies are only conducting test drilling which does not use hydraulic fracturing techniques to establish the quality of the shale. Nevertheless, this test drilling has stimulated energetic opposition. A key tactic in the repertoire of actions employed by shale gas protestors
is the establishment of protest camps at or nearby specific shale gas extraction test sites. For this research I visited two protest camps in which groups of activists occupied and lived in makeshift accommodation on pieces of land in close proximity to ongoing or proposed drilling. Those involved at the two camps I visited preferred to call these spaces protector camps (and themselves protectors) in order to rid themselves of the negative connotations of the word protestors. Such associations include those that equate protestors with general public nuisance and others that paint them as a purely disrupting influence on day-to-day life, devoid of any useful purpose. This careful choice of language served to highlight how the ‘protestors’ see their role as frontline protectors of the natural and cultural landscapes they see as threatened by the process of shale gas extraction.

The first camp visited was on the outskirts of Greater Manchester at Barton Moss (Point ‘B’ on Figure 3), and at the time of my visit it was being dismantled after six months of occupation during test drilling for shale gas by IGas in a nearby field during the winter of 2013-14. This well was not being hydraulically fractured; it was being drilled in a conventional manner to test the site for the presence and depth of gas-rich shale rock. If the presence of large quantities of gas is proven then it may be hydraulically fractured at a later date. The camp consisted of a strip of land beside the sole narrow vehicle access road to the drill site, which was being occupied, I was told, by anywhere between 50-100 people on a daily basis over the duration of the camp’s existence, with more local people often joining the camp at weekends.

Activists explained to me how they engaged in daily ‘slow walks’, where, in an effort to delay daily operations they walked in front of the incoming vehicles carrying equipment, with the intention of causing disruption and financial harm\(^\text{18}\) to the drilling company. These walks often included troublemaking tactics intended as peaceful disruption, such as activists locking themselves to vehicles or laying down together across the road. Their presence on this site and the protest methods they employed led to a near constant presence of the Greater Manchester Police, the heavy-handed tactics of which were severely criticised by protestors and the subject of an independent review in October 2014 (GMPCC 2014). Whilst the policing of protest and the criminalisation of legitimate dissent are topics beyond the scope of this thesis, they look set to be important debates if shale gas extraction continues apace and more individual sites are set aside for drilling as envisaged by the incumbent UK government.

\(^\text{18}\) During my visit one prominent member of the Barton Moss camp told me that IGas had reportedly lost £2million due to the presence of the protest camp and the actions taken to disrupt daily drilling operations.
Figure 3: North West England - Fieldwork Locations. Highlighted are the three shale gas sites that were visited (D, E, F) together with other cities visited as part of the fieldwork for events and to meet people (A, B, C, G, H). Created with Google Custom Maps 19.

Later on in the fieldwork I interviewed several individuals with direct experience of the Barton Moss site. A Labour Party MP who represents the parliamentary constituency 20 where the site is situated objected to the drilling at Barton Moss on pragmatic grounds saying that the site (Figure 4) was inappropriate due to the proximity of residents and an ecologically important peat bog nearby. She was not opposed to shale gas extraction in the UK in principle. Her view was that as a location for shale gas extraction, Greater Manchester, with its large population is wholly inappropriate when compared to the parts of the North West where there are fewer people. She was particularly critical of IGas’s approach to consultation with local people in their creation of ‘community forums’ for residents of nearby settlements, calling it “very strange”. “Their approach limited participation, and they were inclined to describe everyone as a ‘stakeholder’ [an impersonal business speak term]. All the community forums were done through public relations personnel and I don’t think it was adequate 21”. Here it appears that local people were made to feel like passive receivers rather than active contributors in a process to decide whether shale gas extraction goes ahead (or not) in their community.

Similarly, I spoke with a representative of the Manchester branch of The Green Party who was more involved with the protest camp itself. He witnessed the police’s behaviour first-hand at the camp. “They made arrests for spurious reasons, and their general attitude that all the protestors down there were criminals 22”. For him, the consultation of local people by companies was conducted in such a way as to

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19 At: https://maps.google.co.uk
20 Worsley and Eccles South
21 Interview 9, MP, Greater Manchester, May 2014.
“persuade people after a decision has already been made rather than being properly consulted. It’s disingenuous to give the appearance of consultation and democracy”\(^23\). An anti shale gas community organiser and campaigner in Manchester who was also involved at Barton Moss was eager to focus on the role of the council: “It’s the council’s responsibility to know what they’re saying yes to and obviously to make people aware, and I can tell you this with certainty having knocked on hundreds of doors, that no one knew what was happening [the test drilling]”. The inability of the council to inform residents or to educate them about what was happening in their neighbourhood has generated some feelings of distrust and suspicion. Many different activists and campaigners I spoke with during my time in Manchester remarked to me how IGas were able to jump through a planning loophole so they did not have to undertake an environmental impact assessment on this site\(^24\). This type of underhand behaviour has bred ill feeling.

![Heavily Fortified Entrance to the Barton Moss Test Drilling Site.](image)

The second camp I visited was at Upton (see point ‘F’ on Figure 3), a hamlet just outside of the city of Chester not far from the England–Wales border. It consisted of a farmer’s field being occupied pre-emptively by a group of around 30 activists and some local residents after investigations by them had showed it to be the only field in England which at that time had legal permission for test drilling. With no actual drilling happening or any presence whatsoever from a drilling company at that time, the atmosphere amongst people was jovial. Yet activists were alert to the possibilities of a rapid change in circumstances. This camp represented a modification in tactics compared to those used at Barton Moss. By occupying and squatting on the land before any drilling equipment had even arrived it forces companies to go through additional legal hoops in order to try to get them removed and slows down their intended rate of progress. I met several people at Upton who told me they had experience of residing at the camp at Barton Moss, which had just been forced to close after a protracted legal challenge by the drilling company.

\(^{23}\) Interview 11, Local Political Candidate, The Green Party, Manchester, May 2014.

\(^{24}\) The test drilling was less than one hectare (it was 0.9 hectares) and was thus exempt from requiring an environmental impact assessment.
The Public Debate
There has also been a concerted effort by organisations to try to contest shale gas by ‘winning’ the public argument. Established environmental NGOs which campaign from an environmental justice perspective have become key voices within the anti-fracking movement. Greenpeace and Friends of the Earth are two particularly important voices. They stage vocal and well-financed online campaigns\(^\text{25}\) that combine awareness raising functions with the aim of pressuring the UK government and holding it to account. Both organisations take an unequivocally oppositional stance towards shale gas extraction but they orient their campaigns towards particular elements of the government’s policy positioning. For instance, Greenpeace ran their “Not for Shale” campaign to object to the UK government’s plans to change the law to allow shale gas companies to drill the rock deep underneath people’s property without their prior consent. This national level NGO campaigning has generated impact in the North West and I met many anti-fracking activists who were familiar with and spoke highly of them. There are also a number of regional environmental NGOs that have devised specific policies and strategies in relation to fracking.

I interviewed representatives for two such NGOs that operate in the North West: The Wildlife Trust Lancashire, Manchester & North Merseyside Branch (LWT) and The Campaign to Protect Rural England, Lancashire Branch (CPRE). Both are regional branches of national entities and they operate with relative autonomy when devising policies for local matters. With shale gas extraction emerging in the North West of England these regional NGOs have taken the lead in developing organisational positions and policies related to shale gas. They claim large pools of members drawn from the North West region on whose behalf they act. Both the LWT and the CPRE explained to me that it was critical to engage in the formal planning system in order to realise their goals. Practically this entails working through local and county level political channels in order to feed into the planning processes for individual sites earmarked for shale gas test drilling or hydraulic fracturing. Both were eager to emphasise that they treat shale gas planning applications the same as any other planning development, and that scrutiny is essential to establish the potential risk for environmental degradation. For the LWT, this also means conducting meetings with the shale gas drilling companies in order to discuss their concerns about impacts on wildlife in the North West. “Our interest in fracking is at base the same as any development, namely, can we mitigate any adverse effects of a development [in this case fracking] on wildlife. We have an educating role to advise our members and members of the general public\(^\text{26}\).” Unlike the Greenpeace and Friends of the Earth who are accustomed to acts of theatrical political protest, neither the LWT nor the CPRE has any explicit involvement with the protest camps or activist organisations in the North West.

CPRE claim that they are “not anti shale gas.” Rather they seek “appropriate development for appropriate areas. We like ‘wilderness’; we like ‘tranquillity’,\(^\text{27}\)” their representative told me. These regional branch NGOs shared an overriding concern for

\(^{25}\) For example, Greenpeace’s Frack&Go (http://www.greenpeace.org.uk/frack-go) and their Not For Shale (http://www.wrongmove.org/) campaigns. Friends of the Earth UK also maintain an online fracking hub (www.foe.co.uk/campaignhubs/fracking).

\(^{26}\) Interview 8, LWT Lancashire Policy Officer, Lancashire, May 2014.

\(^{27}\) Interview 3, CPRE Lancashire Employee, Manchester, April 2014.
shale gas as having the potential to impact negatively on specific local ecological habitats, local wildlife (especially protected species), and the aesthetic qualities of local landscapes. National NGOs tend to focus on local impacts together with a broader concern for larger issues around climate change mitigation and the UK energy system. These sorts of concerns featured mainly in the background for these regional level NGOs. Neither of the regional NGOs told me of any interactions with the grassroots activist movements that have arisen in this region. They contest fracking in their area as it represents a tangible threat to the aims and values of their organisations and their memberships. Despite their concerns about the risks involved with shale gas extraction, the CPRE expressed an awareness of the political dilemmas and trade-offs faced by decision-makers. Their representative explained: “we must be aware of the benefits. In the Fylde there is a situation of agricultural job decline, rural isolation and poor skills. You can’t just dismiss fracking out of hand\textsuperscript{28}. Such an admission again highlights the difficulty of balancing concerns about the risks to environmental systems with the potential benefits that could accrue and positively impact on the welfare and economic prosperity of the people that live in the North West.

At the most micro level, shale gas extraction is being contested and resisted by a groundswell of grassroots civil society organisations. These differ from the regional NGOs in that they are at the level of individual communities and have no financial backing from a bigger NGO apparatus. In the North West these have taken the form of place-specific groupings that have emerged organically, usually in response to a particular proposed site but also linked to local environmental political groupings often connected to the Green Party or the trades unions. They cultivate relationships with other such groups in the region in order to share information and support one another. The role of such groups is two-fold. First, to campaign against specific proposed shale gas extraction sites using different means of political action. Second, to raise awareness and educate people in their own communities about shale gas in the UK, and (in their opinion) the potential for gravely negative impacts should it become widespread in the North West and the rest of the UK. During both the fieldwork and the background research, no grassroots civil society organisations that campaigned on a pro shale gas platform could be located.

One such group that I met was Residents Action on Fylde Fracking (RAFF). As the name suggests they are based in the Fylde region of Lancashire, and they have been engaged in activities to contest shale gas extraction ever since the first UK well was drilled on the Fylde peninsula in 2011. Largely a collection of retirees based in and around the town of St. Anne’s and Blackpool, they told me that as a group they have a flat organisational structure with members sharing and learning skills from other grassroots groups in the North West and beyond. They participate in peaceful rallies and protests in the region, hold local community meetings across the Fylde to inform residents about shale gas and their work to contest it. They also maintain an active presence on social media platforms such as Facebook and Twitter. At heart, RAFF strongly advocate the government abandons its pursuit of shale gas in the UK and put this effort into creating a renewable energy future.

"Why can’t we become the industrial base for the ‘green revolution’ [instead of the ‘shale gas revolution’]? You know it’s the same thing; you still need to

\textsuperscript{28} Interview 3, CPRE Lancashire Employee, Manchester, April 2014.
Groups contesting shale gas brought up consistent themes in their interactions with me over the course of the fieldwork. Common to every interviewee was a concern about the adequacy of existing regulatory structures. For many, the façade of existing government and corporate consultation processes was a crucial issue. They felt they were being talked at rather than listened to, with the decision to press ahead with shale gas in the reason a foregone conclusion rather than a point for debate. For some, the infringement on property rights resulting from the government’s plans to change subsurface trespass laws was a significant point of contention. In summary, the tactics and strategies by which different groups of individuals are contesting shale gas extraction in the North West are varied and emanate from a number of disparate groupings – national NGOs, regional NGOs, grassroots civil society groupings, and protest and activist groupings. Tellingly, the MP I interviewed in Greater Manchester told me, when talking about the test drilling that took place at Barton Moss, how: “they [IGas] constantly said ‘we’re not fracking’ – but that’s the purpose in the long-run.” Those contesting shale gas realise that this is the reality. Unlike citizens in the US, they feel that they have an opportunity to push back against the shale gas industry before it takes root in the UK. Knowledge of its effects on people and the natural environment is constantly growing, and they feel that if they do not act now, significant environmental change could be wrought upon the landscapes that they live in and cherish.

Extraction Looming on the Doorstep

“There’s a growing community understanding that scare stories don’t apply.”
Francis Egan, CEO of Cuadrilla Resources, speaking at the North West Energy Task Force Conference, April 2014

“Nothing that we do could change their decision to drill here.”
Interviewee and Resident of Roseacre, The Fylde, Lancashire, May 2014

“Money can’t buy my health.”
Interviewee and Resident of Roseacre, The Fylde, Lancashire, May 2014

“I’m not saying I’m anti [shale gas] – we’ve got to find alternative sources of energy. If it’s regulated properly I can live with it.”
Interviewee and Resident of Roseacre, The Fylde, Lancashire, May 2014

The imminent possibility of shale gas drilling taking place in small communities such as Roseacre\(^{31}\) in Lancashire has generated a number of different responses and reactions from the local residents that live there. Visiting this hamlet in the middle of Lancashire, set a few hundred metres away from one of the next proposed hydraulic

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\(^{29}\) Interview 2, RAFF Members / Residents, St Anne’s, April 2014.
\(^{30}\) Interview 9, MP, Greater Manchester, May 2014.
\(^{31}\) Nearby Little Plumpton is the second of the two locations currently earmarked for test hydraulic fracturing at some point in the near future. The drilling company is currently seeking planning permission.
fracture sites, I heard tales of community disruption, personal fears about risks to people’s lives and livelihoods, anecdotes of property sales falling through, and concerns that shale gas will harm the planet. I also spoke with less overtly sceptical individuals for who shale gas could be made acceptable under certain conditions, namely around the robustness of regulations. This final part of the results section looks at if and how the conflict over shale gas in the North West is impacting on peoples lives already.

Despite pronouncements by key individuals within the UK shale gas industry that people are not persuaded by the “scare stories” spread by activists and campaigners who are vociferously against shale gas extraction (see Francis Egan quote above), there remains a vocal cohort of residents who oppose plans to drill in close proximity to their properties and families. I attended a packed community meeting in a small village near to Roseacre called Wrea Green, also in the Fylde region of Lancashire. It was organised by RAFF\(^{32}\) and it gathered together many smaller anti-fracking groups from around the Fylde area to discuss the issue with residents drawn from a number of towns and villages in this part of Lancashire. It was an emotionally charged event with participants fully aware of having to “balance the potential benefits against the acceptable risks.” There was an overwhelmingly fearful and anxious mood in the room. One participant neatly encapsulated this when he stated to all those assembled that “the more you know the more worried you tend to be.” This climate of anxiety was echoed in the comments of the Lancashire Wildlife Trust: “Fracking is creating a lot of fear and uncertainty. It’s an unfamiliar technology. It’s not something that folks in areas where its immediately proposed are used to…people in the Fylde have no history of industry\(^ {33}\).”

‘Nimby’ (not in my back yard) is an accusatory and pejorative term often thrown in the direction of residents like this who oppose unsightly developments in their local areas. Whilst selfish Nimby tendencies often connected to property values and visual amenity may act as a core motivation for some of these local campaigners, such language fails to capture the complexity of those contesting shale gas extraction in Lancashire right now. Many of those encountered as part of this research were opposed to shale gas extraction happening anywhere in the UK, not just on their own doorsteps. As one representative from RAFF put it to me: “we’re NOMPY’s (Not On My Planet)”. They see themselves as protectors of the local and the global environment, set against the powerful interests of industry and the machinery of government. They think about climate change and view the shale industry’s arrival in their county as a force for bad, not just for them but as a potential precursor that sets in motion the spread of shale gas extraction around the entire United Kingdom.

Whether these residents stand to gain economically from a shale gas industry setting up on their doorsteps is currently shrouded in uncertainty. Companies have committed to channelling a small percentage\(^ {34}\) of profits back into communities, though how much this amounts to and how this will be distributed between different groups and individual’s is still uncertain. Moreover, there is a strong feeling amongst many that

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\(^{32}\) Residents Action on Fylde Fracking

\(^{33}\) Interview 8, LWT Lancashire Policy Officer, Lancashire, May 2014.

\(^{34}\) INEOS, a newer player in UK shale gas drilling, has pledged to give back 6% of its income to residents, landowners and farmers (See: http://www.ineos.com/de/businesses/ineos-upstream/news/ineos-plans-25-billion-shale-gas-giveaway/?business=INEOS-Upstream).
their principles cannot be bought off by a powerful gas company wielding substantial sums of money (see quote at beginning of this section). Drilling companies have issued a variety of pledges that affected communities will see financial benefits from the proceeds from every well drilled, usually a small percentage of proceeds. Cuadrilla has also begun to try to curry favour among locals and to appear as a provider of economic benefits. This includes, I am told, sponsoring a local Rugby club and dripping money into small community projects including a local theatre.35

Residents in Roseacre reported to me how shale gas is causing rifts within their small community, pitting landowners and farmers with gas under their feet into disagreement with some of the nearby residents who want to maintain rural tranquillity and avoid the disruption of having a risky industrial process on their doorstep. In Roseacre, one wealthy landowning/farming family have leased their land to Cuadrilla, to the ire of many nearby residents. One resident explained to me how “they [the wealthy family] told me ‘it’s just something we had to do’. I think it was for purely financial reasons36”. Farmers and landowners are probably conscious that if they do not take the money from the gas company for leasing their land for exploratory drilling, another farmer probably will instead, such is the nature of this widely spread subsurface shale gas formation. Clearly, envy and feelings of betrayal and mistrust run through those in the village who feel let down by their neighbours. That said, one thing which shale gas has fostered within parts of this community is a renewed spirit of political engagement and activity, especially among residents who may have been more apathetic towards energy politics if shale gas extraction had not arrived on their doorsteps. “People who previously would not voice concerns are now active37”, one resident told me. All of the residents I spoke with had never been involved in community environmental activism until shale gas extraction became a possibility in their area.

Risk
As mentioned in the last section, one word emerged as a surprisingly consistent and defining feature during the entirety of the fieldwork – risk. It was mentioned frequently in the interviews that I conducted and was a topic for keynote speakers and discussion panel members at several major shale gas conferences in the North West in the spring of 201438. What does the reoccurrence of this term say about the nature of this environmental conflict? Shale gas extraction presents a number of identifiable risks. These can be split into three distinct risk categories: risks to human health; risks to localised ecosystem functioning, and risks to planetary system health. Some of those who will bear the risks of having shale gas extraction on their doorsteps are eager to frame shale gas in a semi-apocalyptic fashion. For them, risk is at the forefront and is seen as unacceptable, undemocratic and unjust. “They can’t say 100% that there’s no risk” one resident said to me. “The only experience they have to fall back on is the US. And Preece Hall39 is hanging around their necks40”.

35 Interview 2, RAFF Members / Residents, St. Anne’s, April 2014.
36 Interview 4, Residents (2) of Treales, The Fylde, Lancashire, May 2014.
37 Interview 7, Resident, Roseacre, The Fylde, Lancashire, May 2014.
38 In particular, the Shale Gas World conference and the IET conference that I attended.
39 Preece Hall in Lancashire was the site of the first hydraulic fracturing test site in the UK in 2011. It was closed after seismic activity was detected here shortly after drilling began. This was a significant setback to the pace of development in the UK shale gas industry.
40 Interview 6, Resident, Roseacre, Lancashire, May 2014.
By contrast, for shale gas companies and the UK government, risk is something that can be managed in the same way as a nuclear power plant manages the risk of meltdowns or any other industrial operation puts risk management protocol into place. The caveat here is that only if adequate and rigorous regulations are put into place does this risk become more manageable, something which at present anti shale gas campaigners think highly unlikely to occur due to the hostile rhetoric of the government and its reluctance to commit to tough regulatory structures for fear of scaring the shale gas industry away. I attended a conference near Liverpool titled ‘Shale Gas: Managing the Risks’. Presenters from companies, government, and scientific institutes all wanted to derive “objective, evidence-based based facts” about shale gas before coming to any conclusions about whether to drill. The manageability of the risks attached to shale gas extraction was the core topic of presentation and discussion here, and people also spoke about the risks of not forging ahead with shale gas in the UK linked to major uncertainties in the future supply of energy. However in the context of government austerity to almost all UK government departments – DECC and DEFRA included – there is a great deal of concern among NGOs that any manageable risks could be compromised by watered down regulation and under staffed and under budgeted independent enforcement agencies.

Shale Gas and Climate Change

Knowledge and awareness among interviewed residents about how climate change links in with shale gas emerged as another key finding. Amongst all interviewees there was an almost universal connection made between shale gas extraction in the UK and the issue of planetary global warming. Objections to shale gas extraction were not purely motivated by the perceived negative consequences of drilling in people’s local area alone. Rather, when questioned about whether concerns around manmade climate change factored into their viewpoints about shale gas, interviewees overwhelmingly said it did. “Fracking is a desperate punt for more fossil fuels…we need respect for the Earth and cyclical systems,” a community organiser from Manchester told me. “We need to wake up and smell the emissions,” a RAFF representative told me, going on to passionately argue how the North West ought to strive to be “the industrial base for the green revolution”. Residents in Roseacre expressed similar sentiments. “This is not a long-term solution…and the methane leaking from wells is bad for climate change”.

A green party member and council candidate in Manchester also linked shale gas with the bigger picture of the UK’s responsibility to decarbonise its energy system. “Do we need the gas in the first place,” he pondered. “We need to grasp the nettle and wean ourselves off of fossil fuels as an energy source.” He advocated government taking the lead and doing everything in its power to manage the full transition towards a renewable energy system, rather than maintaining a reliance on fossil fuels and squeezing the last bits of gas from the rocks. An anti shale gas speaker at a fracking debate organised by the Manchester University Debating Union in May 2014 articulated this point particularly cogently – “this is the last gasp of the fossil fuel

41 Interview 1, Community Organiser, Manchester, April 2014.
42 Interview 2, RAFF Members / Residents, St. Anne’s, April 2014.
43 Interview 2, RAFF Members / Residents, St. Anne’s, April 2014.
44 Interview 5, Resident, Roseacre, Lancashire, May 2014.
dinosaurs”. These collected perspectives reveal how shale gas is not an issue solely confined to reactive and selfish opposition – the sort often dismissed as ‘nimbyism’. Rather, local community opposition groups are connecting it to climate change and the place of the UK energy system in confronting that momentous challenge.

Even though a clear trend emerged amongst those interviewed linking shale gas in their communities and climate change, the findings around how climate and shale intersects in the UK are not completely clear-cut. It is curious that in the national shale gas debate the climate argument is used both ways. Those advocating shale gas argue that it is a transition or bridge fuel that can dramatically reduce our reliance on coal-fired power plants, which have a far higher emissions footprint than those run on natural gas. For them, shale gas can help to save the climate. “Shale gas is part of the answer to climate change,” proclaimed Duarte Figueroa of DECC at a major shale gas conference. Shale gas extraction is championed as a way to reduce the UK’s carbon emissions whilst simultaneously being condemned as a technology with major uncertainties around fugitive methane emissions and the extent to which it will distort the growth of the burgeoning renewable energy sector.

Those spoken to as part of this study expressed a unanimous preference for supporting the renewable energy sector ahead of propping up a shale gas industry. An anti-fracking campaigner and community organiser in Manchester who worked with residents in opposition to the test drilling at Barton Moss told me how she is working to set up a community energy co-operative in Greater Manchester to challenge from the bottom-up the power of the large UK energy companies as the sole providers of power. She told me:

“I think there needs to be a two-fold thing of reduced demand and increased decentralised renewable energy. I think it has to be decentralised because of the way the political system works. Looking into community energy co-ops recently, it’s so reliant on government regulations; so there’s this feed-in tariff stuff, which is the only way that community energy can be profitable. Basically government needs to be on our side and if they’re not on our side and there are threats to corporate profits they’ll change the rules of the game so that community energy doesn’t work. Communities need to work across, nationwide, and the only way of really protecting that is owning the storage and being able to supply locally because if you’re tied into the grid then you’re tied into national government … if decisions were taken at the local level then it would reduce apathy.”

The emergence renewable energy co-ops in the UK provides a positive and environmentally conscious alternative to the narrative peddled by government and shale gas drilling companies that the UK must develop its shale gas reserves. It exemplifies the struggle for power and control in the UK energy sector in an era where concerns about manmade climate change are coupled with the continuing decline in North Sea oil stocks and treasury (and company) revenues connected to that. A mixture of large private and public actors currently controls large-scale renewable energy technologies, but the growth in co-ops and smaller-scale networked

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46 Department for Energy and Climate Change
47 Shale Gas World Conference, National Exhibition Centre, Birmingham, May 2014.
48 Interview 1, Community Organiser, Manchester, April 2014.
technologies provides a threat to that. Evidently, who has the ‘power to make power’ is currently not set in stone. How sustainable power generation will be governed in future decades will depend to a great extent on government policy connected to shale gas and regulatory structures put into place to organise and facilitate co-ops such as this.

As this section has shown, the prospect of shale gas is impacting on communities in a number of different ways. Risk has emerged as an embodiment of the practices of shale gas extraction, and to date the debate is far from settled about whether or not this process is fundamentally and inherently risky. Drilling companies are eager to prove to communities that they can operate in a risk-free way, whilst sceptical residents in the North West resent being treated as the UK’s testing ground for a process that has generated so much controversy, and is clouded in such uncertain outcomes. Shale gas is impacting on the lives of people and communities today, by causing upheavals in peoples lives and generating community frictions before large numbers of wells have even begun to be drilled. Moreover, people’s opposition to shale gas extraction goes beyond simple fears of local level risks and connects up to a conscious awareness of planetary wellbeing and the need for rich technologically advanced countries like the UK to lead the way in transitioning from a fossil fuel based energy system to a sustainable and renewable one.

**Landscapes of Extraction, Landscapes of Risk, Landscapes of Wonder**

“This will NOT result in an industrialisation of the landscape.”
Andrew Austin, CEO of IGas, Shale Gas World Conference, Birmingham, May 2014

“The industrialisation of Lancashire has left us with a lot of contaminated land and its associated environmental issues. Whilst it did a lot of good it also did a lot of harm.”
Interviewee, Lancashire Wildlife Trust, May 2014

“The countryside up here is wild, it’s beautiful. They’re [the Conservatives] misrepresenting what Lancashire is like purposely, because they know a lot of their core voters don’t know enough about the countryside up here.”
Interviewee, Activist/Filmmaker, Manchester, April 2014

Landscapes are simultaneously physical assemblages and cultural objects, reflecting the lived experience of historical waves of human settlement. North West England is a patchwork of physical landscapes comprising both high peaks and fertile lowland agricultural plains, criss-crossed by areas of significant urbanisation and human settlement including Greater Manchester, Liverpool, Preston and Blackpool. The landscapes of this part of England bear some of the marks left from the modes of industry that took root here during the era of the industrial revolution, both in the way settlements are distributed spatially and the larger-scale modifications that occurred to landscapes from human activities. Today, the highly concentrated centres of industry that were once powerhouses of the regional North West economy have shrunken.
significantly. Many of those contesting shale gas extraction contend that a similarly epochal shift could occur should this part of England embark upon a course towards being the hub of fracking in the UK. As the quotes above allude to, the extent to which shale gas extraction will result in an *industrialisation of the landscape* is both uncertain and bound-up with different ideas about the industrial heritage of this region and the role of industrial activities in the future. This section looks at the research results connected to the politics of landscape change – both physical and socio-cultural.

**Physical Landscapes**

The physical footprint of shale gas extraction and its related infrastructure is a key node in the discourse of shale gas extraction in the UK. How many individual well pad locations will need to be constructed to extract the quantities of gas for a UK shale gas industry to be economically viable? How will the cumulative impact of large numbers of well pads impact upon local people and local ecologies, especially in parts of a densely populated country like the UK? What impacts would shale gas extraction have on the landscape if something goes wrong? These complex questions are hard to answer at this very early stage of the development of shale gas in the UK, but interactions with companies and individuals over the course of the fieldwork have shed some light on this.

Bradshaw (2014:65) notes, in reference to the United States, how “the development of a shale gas play requires the drilling of a large number of wells to maintain production, as the flow from individual wells declines quickly.” Consequently, many shale gas wells have been sunk in the US. The empirical evidence to date about the spatial frequency and extent of shale gas drill pads comes chiefly from the US experience. Photographs of rural landscapes in the US modified significantly through the processes associated with unconventional energy extraction are almost uniformly featured in activist literature (Figure 5). However, as I found out, technological innovations are reducing the need for landscapes to be modified so dramatically, and the practices of the drilling companies operating in the ‘wildcat’ early days in the US – when many thousands of shale gas wells were drilled at a feverish pace – cannot be equated with the drilling technology that exists today.

The shale gas industry is conscious of the need to reduce the amount of well pads it constructs in order to physically extract shale gas from the subsurface. Cuadrilla and IGas spoke enthusiastically at two different conferences in May 2014 about the possibility of the installation of ‘super pads’ or ‘multi-well pads’ in the North West region. These are single drilling pads that can accommodate multiple individual wells (around 10 was mentioned to me), which can extract gas from different lateral sections of the shale rock up to a certain radius away from the site. As well as being financially beneficial for companies to centralise their operations at fewer sites it also decreases the amount of local opposition and planning applications they must negotiate. The companies’ claim in their presentations that super pads will reduce “environmental impact”, a vague way of saying it will lessen surface impacts. These super pads do not diminish the potential risks linked to the process of hydraulic fracturing. In fact, significant uncertainties remain about the size of these super pads and precisely how

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49 The term ‘play’ refers to a section or formation of shale strata sharing similar geological and geographic properties that contains a significant accumulation of gas. It is a term more commonly used in the US.
much associated industrial activity – truck movements, round the clock drilling, flaring of gases - they would require when fully operational as compared to the existing pad design consisting of one or two wells on a single site.

Whilst the interviews did not pose questions around the technicalities of single versus multi well pad drilling, they did shed some light onto how existing residents view the threats to their physical landscapes. One Fylde resident who was passionately opposed to shale gas in her local area explained to me how she sees humans fitting into physical landscapes: “I feel that I’m a custodian of the landscape and the other animals around me. I would feel that I need those other things as well. I might be looking after the things that I can look after, simple things like feeding the birds, breeding the frogs, making sure that the bird boxes are put up. We’re custodians of that giving them a chance.” Clearly this interviewee felt a strong sense of connection to her local natural environment as a ‘custodian’. Later on in this same interview we moved on to speak about the notion of risk as it relates to shale gas extraction in Lancashire. “The ones who know about it and are in favour of it psychologically try to reduce the risks and say: ‘well, they can be managed’. People like myself will not be convinced that those risks can be managed because I know having worked in the health service for so long, that you have your protocols, you risks assess, but mistakes will happen … risk management doesn’t mean to say you’re cutting out all risks. What risk management means that you’re lessening it.” Differing ideas about the manageability of risk as compared to the fundamentality of shale gas extraction as a risk-laden process emerged as a surprising yet consistent theme during the fieldwork, and links up with many of the factors related to landscapes. This will be further examined later on.

When considering physical landscape impacts, the temporality of drilling pads is also a critical element, and one that is currently unknown. This is especially pertinent when one thinks about the impact of extraction cumulatively. For its proposed exploratory well pad at Roseacre Wood, Cuadrilla (Cuadrilla 2014: 9) detail how the drilling, hydraulic fracturing and flow testing stage of the works, described as the “period of drilling and fracturing activity,” would last for approximately two years and test four individual wells on this same site. This would be followed by two more years of extended flow testing to establish how well the gas flows up from the subsurface. This secondary period is described as the “period of lower intensity activity.” In this initial

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50 Interview 4, Residents (2) of Treales, The Fylde, Lancashire, May 2014.
51 Interview 4, Residents (2) of Treales, The Fylde, Lancashire, May 2014.
period the large part of the localised disruption will occur due to vehicle movements and the operations of a site. This description is for a single exploratory well pad site. It must be made clear here that whilst individual wells are temporary pieces of infrastructure that would each exist for only several years, if the UK goes down the path of developing a domestic shale gas industry then its presence in certain parts of the country – Lancashire, most prominently – will be permanent for several decades at least by virtue of the continual drilling of different well sites at different pad locations.

**Landscape Meanings**

This section turns now to the issue of contested landscape meanings. What do the landscapes of the North West mean to people, especially those interviewed over the course of this research that live and work there, and those that campaign for it to be protected? The term landscape cannot be divorced from its social, cultural, and historical connotations, and Bridge et al. (2013: 335) argue that landscape, beyond the physical, refers to cultural connections and emotional attachments to particular geographical settings.

Gas-rich geological formations underlie much of the North West. Here, the major frontier for shale gas development today sits in the Fylde peninsula in Western Lancashire. It was at a conference in the Fylde seaside town of Blackpool where in April 2014, the then Minister for Energy, Michael Fallon (he is now the Secretary of State for Defence), gave a keynote address and proclaimed to assembled delegates, myself included, that shale gas is “one of the most exciting industrial journeys of our lifetime”. Talk amongst industry representatives was often about “becoming Aberdeen”\(^{52}\). One prominent contributor to a panel debate at the same conference stated that “the industrial revolution started in Lancashire and there’s no reason why the shale gas revolution can’t start here.” In this statement he evoked the industrial heritage of Lancashire and the North West more generally, and positioned its landscapes as somehow intrinsically linked to industrial production. This encapsulates a mind-set and a way of framing shale gas that was frequently expressed over the course of the fieldwork by those sympathetic to its development in the UK.

Similarly, in their 2013 report ‘Getting Shale Gas Working’ (Taylor & Lewis 2013) the Institute of Directors (IOD), an industry body which looks upon shale gas in the UK with favourable eyes, claims that “viewed from a historical long-run, a shift to exploit the Bowland Shale in Lancashire is not a radical departure out of keeping with the region. Instead, it should be considered as a historical continuation of 1,000 years of often first or early mover advantage in nascent industries” (Taylor & Lewis 2013:38). Tellingly, Cuadrilla Resources sponsored this report – the company that holds the PEDL licence for drilling in much of Lancashire. Here and in the comments made by ministers, a clear linkage is being made by the pro shale gas camp to evoke the legacies of the North West’s experience with industrial production and mineral extraction. However, there is a problem with these assertions. Not all of Lancashire’s landscapes are urban-industrial ones. The Fylde peninsula, the location for the conference mentioned above and home to the UK’s first forays into shale gas extraction, is predominantly an agricultural area circled to one side by coastal towns including Blackpool and Lytham St. Anne’s. The land upon which companies are proposing to house shale gas extraction sites is rural farmland close to small rural

\(^{52}\) Aberdeen in North East Scotland is the UK’s hub for oil and gas from its offshore reserves in the North Sea.
hamlets and communities, the inhabitants of which are often engaged in livelihoods practices connected to the rural economy. Largely, the landscapes the UK government wants to transform into the frontiers of fracking are not the urban or peri-urban patches of land that make up the North West’s larger network of former cotton towns – it is the countryside.\(^53\)

Talking with residents in the Lancashire hamlet of Roseacre about what their landscape meant to them, several of them described to me what they think about shale gas in relation to the industrialisation of rural areas. For one it meant “having lots of well pads” and “ruining tranquillity”\(^54\)” in places that are currently considered rural. “Traffic, light and noise pollution”\(^55\)” was a major concern for another. A young mother\(^56\) linked the issue of landscapes to tourism and expressed concern that the establishment of a new industry would impact negatively on the Fylde as a regional centre for tourism, particularly in Blackpool and the surrounding countryside which are areas frequently by walkers and cyclists. RAFF\(^57\) added concerns about truck movements, flaring of gases, and industrial operations at night. In the interactions I had with people, these concerns about landscape tended to be secondary to the chief concerns of residents – risks to human health and the contamination water resources. The health of people’s families and friends and the availability of clean water sources remained highly emotive points of discussion.

In Manchester, the activist I spoke with who was involved at Barton Moss passionately told me about his connection to Lancashire and the North West. For him it was an area of stunningly beautiful nature, which is being misrepresented by political elites\(^58\) to portray that what nature remains has been spoilt beyond repair from decades of industry. He added, “Lancashire is the same as the Congo … we’re all the global periphery now. We are all the third world”\(^59\). His view was one of extreme scepticism towards the intentions of the government and companies pushing ahead with shale gas extraction in the North West. As has happened in some parts of the Global South, this perspective sees North West England as a sacrifice zone where economic misfortune and environmental externalities can be located away from those in the powerful metropolitan centres.

I also spoke with CPRE Lancashire about what these landscapes meant to them. They were clear that the industrialisation of the countryside “is the nemesis of the organisation”\(^60\). In addition to the physical intrusiveness of the operations of shale gas extraction, they are wary of portions of the rural North West “losing the characteristics of ruralness”\(^61\). Though this organisation does not claim to be anti shale gas and could

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\(^{53}\) Evidently this does not apply to the example of Barton Moss in Greater Manchester that has been explained previously. Though the area adjacent to Barton Moss is more built-up than rural Lancashire, it has received significant media attention and been subject to local opposition precisely because it is nearby to areas where large amounts of people live.

\(^{54}\) Interview 7, Resident, Roseacre, Lancashire, May 2014.

\(^{55}\) Interview 6, Resident, Roseacre, Lancashire, May 2014.

\(^{56}\) Interview 5, Resident, Roseacre, Lancashire, May 2014.

\(^{57}\) Residents Action on Fylde Fracking

\(^{58}\) See quotation at the beginning of this section.

\(^{59}\) Interview 10, Activist/Filmmaker, Manchester, May 2014.

\(^{60}\) Interview 3, CPRE Employee, Manchester, April 2014.

\(^{61}\) Interview 3, CPRE Employee, Manchester, April 2014.
approve of it in appropriate settings, for them rural land that falls under green belt\textsuperscript{62} protection status ought to be off-limits. One of their core ideas, expressed to me several times, is that of ‘living landscapes’ which recognises the need to balance the necessities of economic development, wealth creation – and in this case national energy infrastructure – with the protection of rural landscapes that possess natural, cultural and heritage values for people. As an organisation, CPRE Lancashire is aware of the non-economic benefits of nature and landscapes for people and is sympathetic to the idea that there is a psychological benefit of preserving rural space for people’s recreation and overall well being. Preserved or restored landscapes can also be economically beneficial for the North West’s tourism and recreation sectors, and generate wider regional economic benefits in terms of improved physiological and psychological human health.

The LWT told me of the long history of interaction between natural ecosystems and industrial production in North West of England. For them it is a “regional myth” that the industrial revolution did only good for the North West. They see it as the source of a large amount of long-term environmental harm for the region particularly as relates to contaminated land and irreversible habitat destruction. “97% of the mosslands [of Lancashire] have been lost since the Victorian times\textsuperscript{63},” the LWT told me. Their core focus is on restoring and protecting animal habitats and natural ecosystems, and they voiced concern that prospective shale gas operations in the North West may affect particular species of spookable birds\textsuperscript{64}. Their broader understanding of the landscape’s place in the conjoined relationship between natural and social systems is one that places greater emphasis on recognising landscapes as about delicate ecological systems, which humans must be careful not to disrupt. “Human beings are a part of nature…we are dependent on nature functioning for our existence\textsuperscript{65}.

What did residents and local activists perceive and understand of the cultural landscapes in which they reside? One resident told me that “we should be guardians of the natural world” and that “we shouldn’t just use it for our own gain\textsuperscript{66}.” Another, who was chair of the local anti-fracking group added, “we have a dense population in the UK. Our rural landscapes are precious\textsuperscript{67}.” The Manchester activist spoke frankly to me about his views on how this could affect physical landscapes. “It’s temporary. This is a smash and grab approach which won’t even give us energy forever\textsuperscript{68}”. Interviewees also expressed personal reservations. When asked what emotions the conflict for shale gas brings-up, one resident told me: “Anxiety, fear, anger, disillusion. Disillusion with this country. If fracking goes ahead here and I was younger I would want to leave\textsuperscript{69}.” The representatives from RAFF told me how “it has totally altered our lives. We never saw our retirement being like this. We’ve been active in local issues before but never like this\textsuperscript{70}.” The prospect of imminent drilling for shale gas taking place in the North

\textsuperscript{62} In the UK, the ‘green belt’ is a policy aimed at preventing urban sprawl by keeping land open around major cities.
\textsuperscript{63} Interview 8, LWT Policy Officer, Lancashire, May 2014.
\textsuperscript{64} Chiefly Pink Footed Geese and Whooper Swans.
\textsuperscript{65} Interview 8, LWT Policy Officer, Lancashire, May 2014.
\textsuperscript{66} Interview 5, Resident, Roseacre, Lancashire, May 2014.
\textsuperscript{67} Interview 7, Resident, Roseacre, Lancashire, May 2014.
\textsuperscript{68} Interview 10, Activist/Filmmaker, Manchester, May 2014.
\textsuperscript{69} Interview 4, Residents (2) of Treales, The Fylde, Lancashire, May 2014.
\textsuperscript{70} Interview 2, RAFF Members / Residents, St. Anne’s, April 2014.
West is impacting on citizens’ lives already, and it is to this domain that the findings section now turns.

V. Discussion

This section discusses what has been learnt from the findings of this thesis and draws linkages between this and previous research identified in the literature review, as well as wider debates. The intention of this section is to highlight what is unique about the case of North West England as well as drawing out insights into the nature of shale gas extraction environmental conflicts more generally.

The Power to Make Power

The specific aim of this thesis was to analyse how shale gas in North West England is being contested, resisted, negotiated and experienced. Shale gas extraction is being contested by a diversity of social groups in the North West. Facilitated by modern communications technology, localised anti-fracking groups are growing in number and interconnectedness, sharing information, tactics, and insights and joining together with national-level campaigning. Regional environmental NGOs interviewed in the region were notable for their opposition to shale gas existing in relative isolation from other anti shale gas groups, preferring to air specific concerns by engaging with the planning system rather than with local protestors and activists. Moreover, there is a hardcore of environmental activists who express their opposition to shale gas via protest camps, demonstrations, and acts of non-violent civil disobedience. These individuals accord with Escobar’s (2006) description of an environmental conflict as often involving the fundamental questioning of capitalistic economic models. Many protestors and local activists – whose views are a distinctly deeper shade of green than the mainstream environmental movement – see the fight against fracking and the fight to stem climate change as intrinsically linked, as well as coupled with a movement to challenge the inequities and injustices of global capitalism as manifested in the UK today.

According to the opponents of fracking in the North West, this region is unsuitable as a testing ground for a method of gas extraction that is still not proven to be safe. Furthermore, imposing this onto people who do not want it is hostile, an infringement of their property rights and wholly anti-democratic. This raises the topic of political power in the UK energy sector, which links in with the wider issue of corporate power in the UK. Some of those contesting shale gas are seeking to challenge the dominance of the powerful energy companies and centralised energy provision by circumventing existing top-down structures, instead attempting to build energy production and distribution platforms at the grassroots level. Here, the critical policy ‘space’, as argued by Andrews & McCarthy (2013) in their analysis of the legal geographies of fracking in the US, is still being worked out in the UK – ‘spaces’ for the shale gas industry, for the existence of decentralised grassroots renewable energy systems or other alternatives. One interesting example of community renewable energy provision has emerged from the vociferous opposition to a shale gas test-drilling site.

71 REPOWERBalcombe – www.repowerbalcombe.com – aims to generate the entire energy demand of the village of Balcombe in Sussex using community-owned and locally generated renewable energy sources.
in a village in Southern England, and in my dialogues with activists it appears likely this will be mirrored in the North West. Community resistance and civil society voices are also feeding into the debates being had in parliament (House of Lords 2014) about regulation, monitoring, and the extent to which shale gas ought to be allowed in protected areas. They, and the sustainable alternatives exemplified in community energy projects, seek to reorient the political power to make power, and to shift the ‘discursive framing’ (Finewood & Stroup 2012) away from the pro shale gas narrative as the only way to meet the UK’s energy needs in the short/medium term.

The pro shale gas camp includes a number of residents in the North West who agree with the arguments around economic and energy security benefits, and who are sceptical of the apocalyptic pronouncements of the protestors and other contesters of shale gas. This echoes ethnographic research from other contexts (Hudgins 2013; de Rijke 2013) that documented communities who have embraced shale gas for the economic opportunities it affords them. However, in the UK, the principal social actors pushing forward the shale gas agenda are certain organs of the current UK government, in conjunction with the drilling companies who of course possess a strong economic interest to do everything in their power to ensure the industry matures to the production stage. This thesis found that support for shale gas on the ground is at best thin, and such support frequently comes with the crucial caveats of tough regulation and absolute assurances of safety. However the number of interviewees in this thesis was low and thus it is not possible to draw sweeping conclusions around people’s perspectives in the absence of a detailed qualitative survey.

As laid out in the findings, some in central government and some in the nascent shale gas industry proclaim this gas as offering a renaissance of the North West’s manufacturing and industrial base (Taylor & Lewis 2013). The findings of this study show that this rhetoric is misleading, and only serves as a crude attempt to promote the industry and build confidence locally by evoking the proud industrial heritage of this region. If shale gas extraction moves through from testing to exploratory drilling and then to full production, it will largely occur in overwhelmingly rural farmland in parts of Lancashire that do not possess an industrial heritage. Moreover, claims of an economic bonanza for local people tend to relegate to secondary importance the significant costs that could occur if something should go wrong and the industry removes itself from the region altogether.

The conflict over shale gas in the UK is a conflict about a physical energy resource stored deep underground that has remained inaccessible until recent technological innovations and energy prices have made it possible to do so. Those fighting against fracking getting started in the UK are not fighting for ultimate control of the gas and a bigger share in the financial rewards its extraction could bring. This is not a material conflict for control as is typically examined in political ecology scholarship focusing on settings in the Global South (Zimmerer & Bassett 2003). It is a conflict about access, and one where those who are anti shale gas extraction are fighting to preserve some form of status quo. They want to leave this shale gas resource undisturbed, untampered with, buried beneath the surface forever. They are fighting for shale gas’s non-use, and further still, for the intellectual energy and financial resources expended

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72 Especially the highly vocal trade body ‘UKOOG’ (The UK Onshore Operators Group).
in this battle to establish a UK shale gas industry to be allocated towards the development of renewable and sustainable energy innovations that do not carry so much risk and uncertainty for local ecologies, people, and the global climate.

This stands in stark contrast to ethnographic political ecology literature analysing shale gas developments in Ohio in the US (Willow et al. 2014), where, in a context of shale gas extraction that has been ongoing for some years, little or no attention among residents to the linkages between shale gas and a warming planet is documented. The trend in the UK to look at the ‘global’ as well as the ‘local’ is reflective of the linkages between major players in organised civil society (notably Greenpeace and Friends of the Earth) and the grassroots anti-fracking movement, and the fact that they have been able to witness the US experience first. It may also be connected to a higher general awareness of anthropogenic global warming in the UK compared to the US. The stance taken by the interviewees in this thesis echoes a recent climate science report that argued that to minimise the acceleration of anthropogenic global warming: “globally, a third of oil reserves, half of gas reserves, and over 80 percent of current coal reserves should remain unused from 2010 to 2050 in order to meet the target of 2°C [of warming]” (McGlade & Ekins 2015).

In their treatment of First World environmental conflicts, some political ecologists (Robbins 2013; Walker & Fortmann 2003) have identified First World values and aesthetics as the central core of disagreements. This stands in stark contrast to resource conflicts in the Global South that often hinge on access and control of productive resources, such as land or forests. What is clear from the findings of this thesis is that shale gas in the UK – and shale gas and extractives environmental conflicts more broadly – occupy a space between these two extremes. It is a fight for control over the destiny of subsoil gas reserves, about who gets to govern the subsurface. It is a clash between opposing conceptions of the energy future of the UK. At the same time, it is a contest over surface landscape aesthetics and a fear of large-scale change being wrought on tranquil rural communities. The fear is that this change could be severely detrimental to the way particular places look and the lives and livelihoods of the people that inhabit them.

The relative power of residents and campaigners who are against shale gas extraction to influence and persuade the upper ranks of the British government has so far been relatively weak. The incumbent UK government is still committed to going “all out for shale”. Ultimately the fiery government rhetoric has made people feel angry, fearful, and disempowered. It has stimulated a response from civil society that is energetically contesting what they see to be an imposition without democratic consent. One representative from an NGO crystallised what sums up the feelings of many when she said, “a cautious approach to this is what’s required … the government needs to be less gung-ho”\(^\text{73}\). Just as Willow (2014:252) spoke about a “new politics of environmental degradation” when examining shale gas landscapes in the US, in the UK there too appears to be a structural shift occurring with the exposure of relatively affluent, articulate, and able individuals to environmental risks and possible environmental harms. This is occurring in locations and communities that are not accustomed to having novel and contested forms of energy extraction on their doorsteps.

\(^{73}\) Interview 3, CPRE Lancashire Employee, Manchester, April 2014
Risk Landscapes, Invisibility and Political Geology

One of the thrusts of this thesis was to focus on the material and cultural aspects of landscapes, in line with a core of political ecologists and other geographers who have utilised the landscape concept as a theoretical node in the treatment of environmental conflicts (Walker & Fortmann 2003; Benediktsson 2007; Hudgins & Poole 2014; Willow et al. 2014). What emerges from the results is the difficulty of ascertaining accurate perspectives on the physical aspects of landscape impacts prior to substantial drilling occurring. Physical landscape impacts are something that future researchers should document and analyse if shale gas extraction goes ahead in the UK. The ecology of natural habitats – some protected by official designations, others not – are at risk of from the impacts of a process and an industry which has the potential to balloon in size and leave a substantial footprint on the terrestrial surface of the UK. In retrospect, a limitation of this study was its inability to obtain significant amounts of material on the aspects of physical landscape change related to shale gas extraction. Whilst a cluster of examples of test drilling sites in the North West exists, there simply has not been enough cumulative drilling to accurately assess the impacts on physical landscape beyond highly speculative analysis or recommendations for future research.

What is clear is that a defining characteristic of the shale gas extraction industry is how it operates in a semi-permanent state of jumping from site to site in order to maximise the amount of gas extracted. How these sites will be spatially distributed and how long drilling is needed at a specific site with the introduction of multi-well pads raises questions about how long an individual hamlet or village will be impacted by drilling from one or more well pads, not to mention an entire county or region. With planning applications being considered by the local planning bureaucracy on an individual basis, one wonders how planners can factor in the cumulative spatial impacts of large numbers of well pads into their decision-making process.

The cultural aspects of landscapes, or landscape meanings, are reflected well in the results. The key finding here revolves around the discord in how the pro and anti shale gas extraction camps view the landscapes of the North West. Here, the landscapes of production–consumption dichotomy, as identified in the political ecology of landscape literature (Walker & Fortmann 2003; Neumann 2011), is useful. North West England is being nudged towards a return to an industrial production landscape with the prospect of large numbers of shale gas extraction well pads and their associated industrial activities on the horizon, but primarily in the rural areas which were not formerly industrial. To get at the gas sitting in the Bowland Shale formation will require an enormous drilling effort with a substantial number of wells peppered across the landscape of the North West. This does not fit in with the view of the local residents and regional NGOs interviewed in this study that prize this part of Lancashire for its consumptive elements: its ruralness, its tranquillity, and its enclaves of nature. Yet, how the landscape will look in the future will be decided by the interactions between these residents who give primacy to natural environments and other residents for whom economic arguments are persuasive and loss of the natural environment is viewed as a small sacrifice. The particular industrial history of North West England feeds into this sense of a return to the ‘glory days’ of old, but, as found in this investigation this feeling can be isolated and abused by social actors in the shale gas debate – companies and politicians – who currently wield far greater political power than individual citizens do.
Shale gas drilling companies and the government are eager to assert the ties with the industrial heritage of the North West. Opponents maintain that the parts of Lancashire that are currently the frontiers of fracking are, and have never been, anything but rural. This raises another fundamental tension inherent with the spread of shale gas operations in the UK - that despite the best practices of companies, their operations will inevitably transform parts of the rural landscape into industrial sites in a part of England where there is a significant population density. The frequency of well pads and the intensity of drilling operations is currently uncertain, but companies that have invested significant financial and political capital into ensuring that shale gas extraction becomes a reality in the UK are incentivised to maximise the scale of their operations within any agreed upon regulatory framework. It is worth noting that at the time of writing, the regulatory recommendations set out in the much talked about Royal Society (2012:6) report have not yet been met by existing UK shale gas legislation.

As highlighted in the findings, risk emerged as a byword in the networks of people and organisations encountered in the North West – both those who supported and those who criticised shale gas extraction. Are the risks of this process to human, ecosystem and planetary health inherent and inevitable? Or, are the risks linked to this process acceptable given the potential financial rewards, and negligible given the ever-increasing levels of knowledge about drilling safety? The reality falls somewhere between these perspectives. Shale gas is a difficult policy dilemma for UK decision-makers, but if a decision is made to embark upon a process that contains risks it must be done in accordance with regulatory protocol that protects people and the natural environment and which is informed by the best available research. The findings of this thesis highlight how the decision to pursue unconventional energy extraction is being advanced by interests linked to financial enrichment rather than a genuine engagement with the people it will actually affect.

Young (2014: 2) points out how “the devices and means utilised for exploration and extraction may alter topography, groundwater flows, and surface water chemistry, with implications for soils, ecosystems, biological diversity and land use.” At this juncture, the term political geology becomes useful from a scholarly perspective. Bebbington (2012) writes about the increasing politicisation of the subsoil, and in many countries shale gas will increasingly become a core part of the national energy policy discourse. The invisibility of shale gas itself is inherent in its materiality. It is not solid fungible matter; it is an invisible gas that only possesses economic value once extracted by costly and controversial means. The landscapes of shale gas extraction comprise the surface system of extraction technologies and gas transportation infrastructure, but it is the subsurface landscapes of shale gas extraction that are less often considered by social scientists. It is under the surface, where amongst the labyrinth of drilling holes and the injection of fluids used to stimulate the flow of gas, irreversible changes are wrought upon ancient geological strata. The substances contained within the subsurface are profoundly politicised against the backdrop of energy hungry human societies that are torn by the necessity to keep fossil fuels buried rather than extracted. The political geologies of shale gas in the UK reveal new and surprising dynamics of political action.
In summary, an onshore gas industry is new for the UK. The shale gas industry and sympathetic politicians seek to locate, extract and transport shale gas resources due to their immense monetary value. If companies’ proposed actions get the full endorsement of local planning agencies there will be consequences for local people, for their local environments, and for the social fabric. These are power struggles between the powerful and the powerless. Social groups are on a collision course where they disagree about the magnitude of environmental change and who it ought to benefit. Those contesting shale gas are fighting for its non-extraction and for a major shift in government policy that confronts the challenges of transitioning to a just and renewable energy system, fit for the contemporary zeitgeist.

VI. Conclusion

Lave & Lutz (2014: 739) astutely point out how there is a “striking disparity between what we wish we knew about fracking and what we know so far”. This thesis sought to examine the environmental conflict over shale gas in North West England and in the wider United Kingdom as one of the new global frontiers of fracking. It has shown that there is a diversity of social actors who are engaged in political action to contest and resist the dominant government and corporate position. An energetic and well-organised opposition movement to shale gas exists in the North West, before the industry has even commenced widespread drilling. This has manifested itself in the form of several protestor (or protector) camps attracting local environmental activists and residents sympathetic to their cause, and a proliferation of grassroots civil society groups and NGOs that contest shale gas extraction in a number of ways. These co-exist with a lively public debate.

This work has also illuminated how this is a public debate where the scientific facts are far from settled. Moreover, it has argued that shale gas extraction is linked to landscape change, and shown how ‘risk’ has emerged as a defining discursive component in this current conflict, from both sides of the debate. Moreover it has documented how both sides use climate change mitigation rationales to aid their arguments, and how the pro shale gas camp in the North West seeks to tie this fledgling industry to the industrial heritage of the landscapes of this region. Finally, it has documented how this conflict is already impacting on communities on the frontiers of fracking in the North West. I feel this thesis has largely met its overarching objective of contributing to the wider political ecology/geology literature that examines extractives environmental conflicts. However, it only captures a snapshot of the UK shale gas conflict in mid to late 2014. It is my hope that it has shown how this conflict is far more about political power and who is able to wield it than it is about winning techno-scientific arguments.

How shale gas extraction will evolve in the UK currently hangs in the balance and depends on a number of uncertain factors, not least the looming UK General Election in May 2015. Whichever party (or coalition of parties) emerges victorious in May they too will have to confront the same policy dilemmas in the energy system as have been examined by the current administration. In academia, more in-depth investigations from the social and natural sciences are needed, and can serve to provide different flavours of analysis. If a shale gas industry takes off in the UK the possibility exists for future research from within critical geography to incorporate a greater multi-
disciplinary emphasis by bringing in ecological variables. This may take the form of independent soil and air analysis in and around drill pads that could be coupled with research into the evolving politics of shale gas. That said, more in-depth analysis from a purely social science perspective is also needed. During my time in North West England I personally came into contact with three PhD students who are presently conducting social science investigations into shale gas in the UK but in far greater detail than I could begin to attempt in this master’s thesis. Readers who are interested in delving deeper into this subject would do well to investigate these authors’ latest publications.

As this thesis was being finalised in early 2015, recent events connected to the wider political economy of energy have affected the prospects of the development of a shale gas industry in the UK. The global oil price has plummeted, throwing into doubt the rudimentary economic viability of UK shale gas. However, this volatility may be short lived. Even if shale gas becomes unviable in the short-term due to volatile commodities prices, it will of course remain underground. The temptation for future governments to revive the shale gas question will be strong. This will be especially true if advances in drilling technology make the extraction process safer and less intrusive for those living at the surface above. As the shale gas debate rumbles on, the most interesting and challenging question to pose is thus: Is a socially and economically sustainable UK shale gas industry and an economically viable UK shale gas industry a compatible proposition? This remains to be seen.

Craig Thomas at Manchester University (https://twitter.com/smartcitadel); Alan Webster at Lancaster University (https://twitter.com/barefdoctor); and Wil Knight at Nottingham University (https://twitter.com/wilk154)
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# Appendix 1: List of Interviews

<table>
<thead>
<tr>
<th>#</th>
<th>Role</th>
<th>Affiliation / Location</th>
<th>Gender</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aneaka Kellay</td>
<td>Community Organiser, Barton Residents Against Fracking &amp; The Northern Gas Gala</td>
<td>Female</td>
<td>April 2014</td>
</tr>
<tr>
<td>2</td>
<td>Ian Richardson, Pam Foster</td>
<td>Members / Residents (2), Residents Action on Fylde Fracking (RAFF)</td>
<td>Female/Male</td>
<td>April 2014</td>
</tr>
<tr>
<td>3</td>
<td>Jackie Copeley</td>
<td>Employee, Campaign to Protect Rural England (Lancashire Branch)</td>
<td>Female</td>
<td>April 2014</td>
</tr>
<tr>
<td>4</td>
<td>Carole Worthington, Alan Worthington</td>
<td>Residents (2), Treales’, The Fylde, Lancashire</td>
<td>Female/Male</td>
<td>May 2014</td>
</tr>
<tr>
<td>5</td>
<td>Cheryl Gilbertson</td>
<td>Resident, Roseacre, The Fylde, Lancashire</td>
<td>Female</td>
<td>May 2014</td>
</tr>
<tr>
<td>6</td>
<td>Jim Nisbet</td>
<td>Resident, Roseacre, The Fylde, Lancashire</td>
<td>Male</td>
<td>May 2014</td>
</tr>
<tr>
<td>7</td>
<td>Barbara Richardson</td>
<td>Resident / Roseacre Awareness Group, Roseacre, The Fylde, Lancashire</td>
<td>Female</td>
<td>May 2014</td>
</tr>
<tr>
<td>8</td>
<td>Dave Dunlop</td>
<td>Employee, The Wildlife Trust (Lancashire, Merseyside &amp; Greater Manchester Branch)</td>
<td>Male</td>
<td>May 2014</td>
</tr>
<tr>
<td>9</td>
<td>Barbara Keeley MP</td>
<td>Greater Manchester</td>
<td>Female</td>
<td>May 2014</td>
</tr>
<tr>
<td>10</td>
<td>Tom Barlow</td>
<td>Activist / Independent Filmmaker, Manchester</td>
<td>Male</td>
<td>May 2014</td>
</tr>
<tr>
<td>11</td>
<td>Martin Burke</td>
<td>Local political candidate, The Green Party (Manchester)</td>
<td>Male</td>
<td>May 2014</td>
</tr>
</tbody>
</table>

Treasles is a hamlet close to Roseacre.
## Appendix 2: List of Events Attended

<table>
<thead>
<tr>
<th>#</th>
<th>Event</th>
<th>Location</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Northern Gas Gala: Activist Skill Building for Frack Free Communities (Weekend Event)</td>
<td>Central Manchester</td>
<td>April 2014</td>
</tr>
<tr>
<td>2</td>
<td>Visit to Barton Moss Community Protection Camp</td>
<td>Eccles, Greater Manchester</td>
<td>April 2014</td>
</tr>
<tr>
<td>3</td>
<td>Visit to Upton Community Protection Camp</td>
<td>Upton, Cheshire</td>
<td>April 2014</td>
</tr>
<tr>
<td>4</td>
<td>Political Studies Association 2014 Annual Conference: Session on Fracking in the UK</td>
<td>Central Manchester</td>
<td>April 2014</td>
</tr>
<tr>
<td>5</td>
<td>North West Energy Task Force: Supply-Chain Conference (1-day conference)</td>
<td>Blackpool, Lancashire</td>
<td>April 2014</td>
</tr>
<tr>
<td>6</td>
<td>Frack Free Greater Manchester – Monthly Meeting</td>
<td>Central Manchester</td>
<td>April 2014</td>
</tr>
<tr>
<td>7</td>
<td>Residents Action on Fylde Fracking (RAFF): Community Meeting</td>
<td>Wrea Green, Lancashire</td>
<td>May 2014</td>
</tr>
<tr>
<td>8</td>
<td>Manchester Debating Union: ‘This house supports the use of fracking in the UK’</td>
<td>Central Manchester</td>
<td>May 2014</td>
</tr>
<tr>
<td>9</td>
<td>Frack Free Greater Manchester: EU Elections Hustings and Fracking Debate</td>
<td>Central Manchester</td>
<td>May 2014</td>
</tr>
<tr>
<td>10</td>
<td>Shale Gas World 2014 (2-day Conference)</td>
<td>Birmingham, West Midlands</td>
<td>May 2014</td>
</tr>
<tr>
<td>11</td>
<td>Institute for Engineering and Technology: Fracking in the UK, Managing the Risks (1/2-day conference)</td>
<td>Warrington, Cheshire</td>
<td>May 2014</td>
</tr>
</tbody>
</table>
Appendix 3: Interview Questions

BASIC QUESTIONS
1. Can you please tell me your name; where you’re from; and who you work for?
2. Could you tell me about the history of your involvement with this organisation?
3. What is your experience of environmental or grassroots political activism?
4. What position do you take on the pursuit of so-called ‘unconventional’ energy in the UK?
5. What values motivate the stance you take on hydraulic fracturing for shale gas in the UK?
   o Do considerations about manmade climate change factor into your views?

THEMATIC QUESTIONS
Contesting Shale Gas Extraction
6. How do you think the risks and rewards of shale gas extraction be distributed between different groups in society if it goes ahead as planned?
7. How do you interact with: (i) the state; (ii) fracking companies; (iii) NGOs; and, (iii) grassroots fracking organisations?
8. In your experience, are the government and fracking firms concerned with genuinely engaging with local communities and those broadly against shale gas development (to achieve environmentally just outcomes)?
9. Is the role of your organisation as reactionary (stopping this particular technology and winning this battle) or something more transformatory (systemic change to challenge capitalist accumulation strategies and the wider economic system), or something else?

Experiences of Environmental Conflict
10. How has the decision by the government to press ahead and go “all out for shale” and licence areas of the NW for fracking, impacted on your life (and/or the lives of the people you represent)?
11. What feelings has it stirred up in both you and the people you represent?
12. How do you think that fracking in the UK, especially for those in the North West, is changing people’s understanding of environmental politics?
   o Are people ‘waking up’ to fracking and thinking more about the environment? Or is the opposite true – apathy, disengagement, business-as-usual?

Landscape Transformations
13. I want to talk about what fracking will do to landscapes. The phrase “industrialisation of the countryside” is mentioned frequently in fracking debates. What does this phrase mean to you?
   o In what ways do you think fracking will have an impact on physical landscape aesthetics?
14. How do you view the landscape in your area? Does the physical landscape carry cultural or historical meanings for you or your community?
15. When you think about ‘the natural world’ how do you see human beings fitting into that picture?
16. What are your views on the role of economic/environmental history in shaping the current environmental conflict around hydraulic fracturing for shale gas?
   o In NW England in particular, do you think the industrial heritage of the area plays a role in shaping attitudes to shale gas exploration / the fracking industry?

CONCLUDING QUESTIONS
17. How do you think the UK should seek to meet its energy needs in the near (and distant) future?
   o Renewables: wind, hydro, solar, tidal?
   o Community micro-generation schemes?
   o Should nuclear power be part of the mix?