THE HUMAN DIMENSION of SHALE GAS DEVELOPMENTS

in Lancashire, UK

Anna Szolucha

THE HUMAN DIMENSION OF SHALE GAS DEVELOPMENTS in Lancashire, UK:

Towards a social impact assessment

Anna Szolucha

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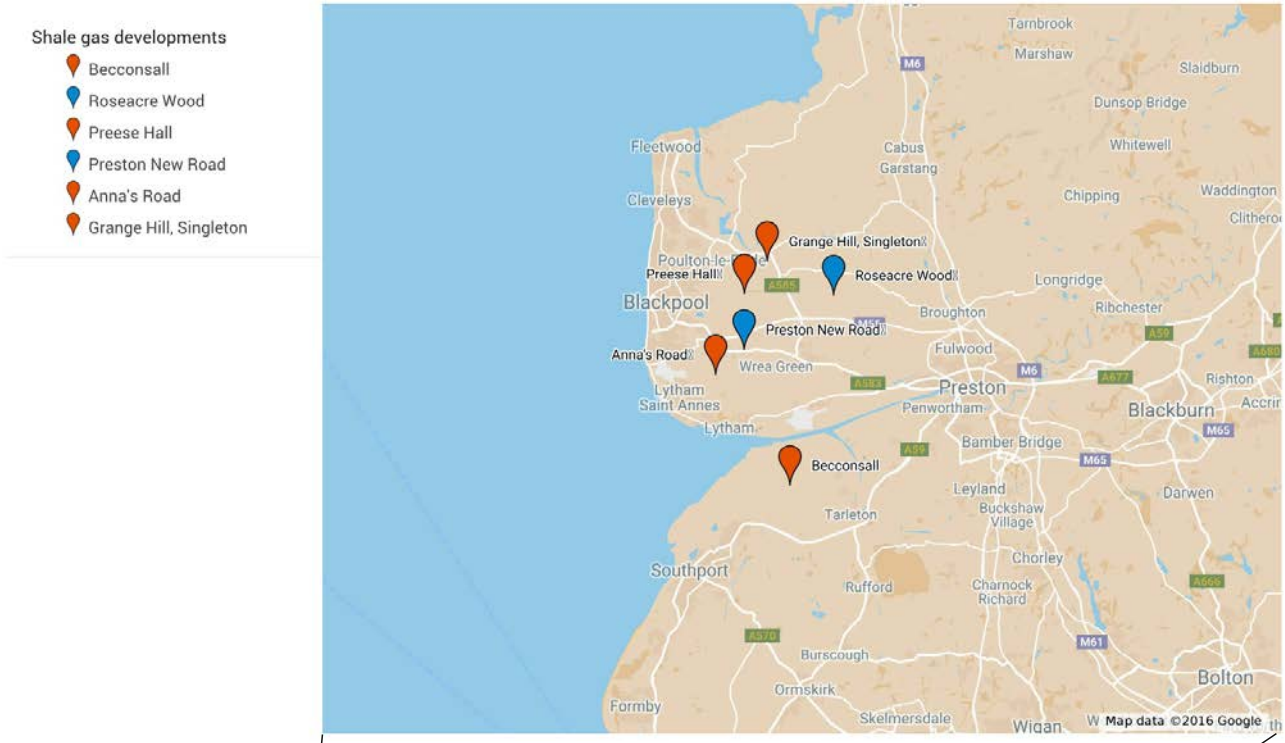

Blue pins: Proposed developments

EXECUTIVE SUMMARY

A thorough understanding of social and psychological factors as well as public understanding of risk is central to taking informed decisions about shale gas exploration and extraction in Lancashire and the UK. On the basis of existing evidence and the research conducted for this report, it is evident that the failure to consider these aspects of shale gas development significantly understates its actual and potential impacts, which may alter the planning balance in favour of development. From a social point of view, assessing shale gas exploration and extraction as a low-impact activity is unsupported by evidence. A social impact assessment should be fundamental in all political and local decision-making about shale gas development that prioritises public health and social well-being.

The following report examines the ways in which social, psychological and political change processes are impacting (and are likely to impact) daily lives, beliefs, values and community dynamics in the context of shale gas exploration in Lancashire. The findings span six main areas: social well-being and health, community impacts, policing and intimidation, democracy, the relationship between the gas company and local residents and gender relations impacts. The findings are based on ethnographic and participatory research as well as on semi-structured interviews. The research was conducted between June 2015 and June 2016. Although most shale gas activities in the country concern exploratory drilling and not full-scale production, a proper social impact assessment cannot reasonably be limited only to the exploration phase.

This research study found that even before shale gas exploration begins it can already have profound impacts on residents. The anxiety and deep feelings against shale gas exploration and extraction in Lancashire have shown that it is not considered a desirable and necessary development. Certain social processes lead to different assessments and understanding of risk on the part of the authorities, the company and those local residents who are opposed to shale gas. Even if stringent regulatory regimes and robust mitigation measures aiming to minimise the risk of pollution or accident were to be applied, they may not be sufficient in alleviating local fears and in reducing the level of perceived risk by the residents.

Feelings of fear and stress about the potential impacts of shale gas exploration and extraction on social well-being and health in the local communities in Lancashire are considerable, lead to and exacerbate a range of health effects. The anxiety has been amplified by a widespread sense of annoyance, disenfranchisement and powerlessness caused by the attitudes of the company and the UK government. The stress and feeling of social injustice stemming from the perception that the company is targeting a vulnerable social group have exacerbated negative health and well-being impacts. Baseline studies would be helpful in monitoring and mitigating the potential consequences of gas development, but it must be noted that in Lancashire the majority of effects was experienced even before site preparation began.

Shale gas development in Lancashire has already had significant adverse impacts on community cohesion and has disrupted neighbour and social relationships. Community disruption has exacerbated certain prior tensions and previously latent unequal status distinctions have risen to the surface. The prospect of shale gas extraction in the county has reopened a fracture between certain members of the communities and has isolated some of the landowners. Shale gas development has also significantly undermined feelings of personal safety in the area. It also has the potential to widen social and economic inequalities and to significantly impact the local infrastructure and services that seem to be unprepared for a rapid change. Through the residents' engagement in the planning process, they have begun to value their local landscape even more than they did before the shale gas applications. Hence the magnitude of disruption to the landscape and the environment that would occur as a result of fracking may be felt as more severe and cause acute stress, adverse health impacts and even psychological trauma. It may also disrupt the individual and collective sense of place-based identity. The popular mobilisation against shale gas developments in the area has had a positive effect on creating a sense of community.

The residents' perception of the police has changed dramatically and is now characterised by a deep lack of trust, although this effect is not as strong in relation to the Lancashire police and most participants in this study agree that they have a good relationship with the local police. The policing of anti-fracking protests has been assessed as excessive and brutal, and many residents feel that the police prioritise commercial and the government's interest at the expense of their rights. They have experienced the effects of criminalisation of the protests and the protesters. There is also evidence which suggests that blacklisting processes and possible police collusion may have been at play in relation to some local residents. 'Contradictory effects of suppression' galvanising the protests have been evident, however, and the majority of interviewed residents have declared that they would be willing to engage in or support direct action. Local residents have many concerns about the security of information and police and company surveillance. This has created an atmosphere of intimidation, distrust and secret surveillance in the area.

Shale gas developments have dramatically changed residents' views about democracy and have made them disillusioned with politics and politicians. The UK government is perceived as imposing shale gas extraction on recalcitrant citizens, which nullifies its democratic mandate. As a result, local residents have revisited their long-held political beliefs. They have challenged the developments from the position of fairness of the democratic distribution of impacts and the principle of subsidiarity. At all local levels, councillors have described the limiting pressures that they have experienced as part of the planning process to consider only certain aspects or impacts of shale gas activities, thus contributing to a sense of imbalance of power between local authorities and the gas industry. This has meant that much of the financial burden of bringing forward additional evidence has fallen on local groups, which have employed experts and legal advisers to help them present their case. The evidence presented by the residents has provided a

corrective balance to the information about the impacts of shale gas exploration as brought forward by the gas company. There is a deep feeling that the government's stance on shale gas undermines the validity of the local democratic process and tips the balance of power in favour of non-local interests. This amplifies the negative impact of shale gas development on people's understandings of and disillusionment with democracy in the UK. At the same time, the residents' appeal to democracy precludes the normalisation of loss of agency, contributes to local empowerment and politicisation and has a democratising impact on decision-making, which has both local and national effects.

Feelings of deep distrust towards the company are very intense in the area. Residents lack confidence in the company and have contested the company’s data and analyses. The planning breaches and possible technical failures have been negatively assessed. Local donations are interpreted as aimed at convincing the communities to support shale gas exploration rather than as contributing to the area’s development. Similarly, compensations to landowners are viewed as meant to overcome local resistance and could potentially constitute a socially divisive conduct by the company. The residents have also contested the dominance of a particular economic rationality employed by the industry. They are also dissatisfied with the way the company has been dealing with their concerns, and the consultations process fell short of their expectations. The company's failure to consider the possibility of accidents amplifies the perceived level of risk.

The effects of shale gas exploration and extraction are not gender-neutral, and men are more likely to benefit from the new job opportunities in the industry than women. Women may also bear most of the burden connected with the possible adverse impacts of shale gas developments.

Timeline of events

2009

Planning permission granted for Preese Hall.

2010

Planning permissions granted for Anna's Road, Becconsall, Singleton, Wharles and Kirkham.

2011

Planning permission granted for Formby (permission expired).
Two earthquakes linked to shale gas operations at Preese Hall.
"Camp Frack I," Becconsall, co-organised by Ribble Estuary Against Fracking.

2012

Public meetings held throughout the Fylde with members of Residents' Action on Fylde Fracking.
Shale gas operations resumed after a temporary moratorium following the earthquakes in 2011.

2013

Anti-fracking camp in Balcombe, Sussex and direct actions across the country.
Barton Moss Community Protection Camp, Salford, in place from November 2013 – April 2014.

2014

Cuadrilla applies for planning permission for the sites at Preston New Road and Roseacre Wood.
Public information days organised by Cuadrilla.
Frack Free Lancashire launched.
“Nanas’ camp” in Little Plumpton.

2015

Planning decisions about PNR postponed after Cuadrilla’s request.
Planning permission for seismic and pressure monitoring at the site in Singleton refused.
Planning permission refused for drilling at Preston New Road and Roseacre. Permission for seismic monitoring at Roseacre approved.
Cuadrilla lodges appeals against Lancashire County Council decisions.
Secretary of State informs the Council that he will make the final determination of Preston New Road and Roseacre appeal decisions.

2016

Public Inquiry takes place in Blackpool to consider Cuadrilla’s appeals.

1 SOCIAL IMPACT ASSESSMENT

1.1 Introduction

Resource developments always bring change. People's ways of experiencing and participating in their surrounding environments change in profound ways at all stages of the development: from planning, through construction and exploration to extraction and abandonment activities. The effects felt by the communities can also extend beyond the lifetime of the development. Projects have the potential to adversely impact local residents and environments, but they may also create new opportunities and bring investment. Some resource developments can also create impacts that reverberate not only on the local but also on the regional, national and even global scale. A key question is whether, on balance, the social impacts associated with shale gas development are considered acceptable in Lancashire and in the UK as a whole.

1.2 Why should we assess the social impacts of fracking?

1.2.1 Gaps in knowledge

Although there are many accounts of environmental and social issues related to fracking in the press and the literature, a comprehensive study of the people, their lives, experiences and rights in the context of shale gas industry activities in Lancashire and the UK is urgently needed (see Table 1.1). There is only a handful of studies on the social impacts of fracking from other parts of the world (see, for example, de Rijke, 2013a; Perry, 2012a, 2012b). When approved, shale gas developments in the UK may dramatically accelerate over the next

couple of years, which makes the need for well-designed empirical studies increasingly pertinent. This study aims to prevent the situation whereby supporting social science will come long after it is most urgently needed to assess the impacts before any damages occur.

There appears to have been no baseline assessment of the social and health state of residents living in the immediate vicinity of the project sites in Lancashire.

Unlike in other countries such as Canada or Australia, where social impact assessments (SIAs) are much more established, there is no statutory requirement in UK regulations to conduct an SIA for resource extraction projects. Compared to environmental impact assessments (EIAs) that examine the environmental and technical aspects of resource extraction, considerations of the social issues have played a minor role in the process. The parameters for social impact assessments are usually narrow and predominantly economic (see Table 1.1.). The profile awarded to social issues in reviews and impact studies on fracking is often low and the effects that are reported can be used instrumentally to advance a particular argument.

The limited resources and the lack of a statutory requirement have influenced the quality of socio-economic assessments of fracking in the UK. There are no specific consultees on social issues that could inform the local planning process (Lancashire County Council, 2015a). The quality of the analyses is often varied. The majority of assessments devote much space to the social and economic profiles of the impacted communities but lack any meaningful and methodological engagement with them. Most agencies that undertake EIAs are not experienced in SIAs (Baines, McClintock, Taylor, & Buckenham, 2003). An international study (Sadler, 1996) found that SIAs and health impact assessments (HIAs) are insufficiently considered and narrowly conducted in EIAs.

Although Cuadrilla's Environmental Statement (ES) (Arup, 2014a) is a useful resource for this study about the social impacts of fracking in Lancashire, community and health effects are not a central focus for an EIA. Many of the aspects addressed in this study expand considerably on the socio-economic analysis presented in the ES. This study is also not constrained to the impacts experienced in the immediate locality of shale gas projects.

1.2.2 Community need

This research found that there has been a strong local and national need to address public concerns about the possible social impacts of fracking. Many local residents as well as other stakeholders were of the opinion that these impacts were inadequately assessed during public consultations with the company as well as during the planning and appeal process. There is therefore a strong need to incorporate social and psychological stress factors as well as public understanding of risk into a science-based study that could inform decisions regarding shale gas exploration and production in Lancashire and the UK.

The local residents felt that there were regulatory barriers hindering the integration, and sometimes even recognition, of social and health information with technical and environmental (i.e. 'material' in planning terms) data provided by the regulators and the company. At the same time the residents noted mounting scientific evidence that local communities may be vulnerable to various health and social risks inherent to fracking.

There is a need to address the multi-scalar argument that localised shale gas developments are justified on the grounds of enhancing national energy security and providing for national energy needs (Finewood & Stroup, 2012).

There may be a 'distributional deficit' in the impact appraisal tools used by the industry as well as by the regional and national government bodies (Walker, 2010). Since vulnerable groups often disproportionately experience the impact of resource developments, it is pertinent that equity issues are central to a social impact assessment. This research responds to the need for a comprehensive assessment of the

distributional effects of shale gas developments that will include analyses of e.g. vulnerable groups and women.

The local residents in Lancashire see fracking as a human rights issue. Therefore, they expect that an independent study of the social, psychological and health impacts of shale gas developments will be conducted in order to examine whether fracking will not pose a significant risk to a range of key human rights (Short, Elliot, Norder, Lloyd-Davies, & Morley, 2015).

1.2.3 Review of corporate assessments

There is a need to undertake an independent review of the claims propagated by the resource extraction industry and of some political decision-makers about the social impacts of fracking in the UK. In particular, the current study examines the claims made by Cuadrilla that shale gas development will not have any significant adverse impacts on the local communities, while, if allowed to progress to full-scale production, the benefits of fracking would outweigh the risks (Arup, 2014a; 'Benefits', n.d.; North & Western Lancashire Chamber of Commerce, 2015).

A more comprehensive social impact study is needed to assess these claims because the availability of data and analysts' tendency to concentrate on certain questions rather than others are widely known and employed to make the assessments more supportive of a project (Freudenburg, 1986a; Kirsch, 2014). Additionally, significant work has been done in the area of the types of judgemental errors and biases that are likely to be present in the technical and scientific assessments that exclude considerations of social mechanisms and processes (Mumpower & Anderson, 1983; Nader, 2010).

The intention here is not to deny the impacts described in the ES but to suggest that both the community and the socio-economic analysis presented therein are incomplete and that the overall impact assessment is inadequate. A more holistic understanding of the social issues associated with shale gas developments is needed. Such an understanding would include the wider determinants of social impacts beyond those based on employment, the economy, access, crime and protest.

The nature, contents and conclusions of an SIA done on behalf of an extraction company, local or national authority or an NGO may greatly differ from a study conducted on behalf of the local community. Although a degree of judgement is unavoidable, there is a need for a comprehensive and independent study supported by a robust literature review. The independence of this study is important for the acceptability of the findings (Watterson & Dinan, 2016).

Although extraction companies in the UK are expected to create opportunities for public participation, especially in the pre-planning stage, research has indicated that community engagement rarely leads to incorporation of the citizens' views in shaping the development. Instead, SIAs triggered by developers seem to be more concerned with legitimising what has already been planned and orchestrating a one-way communication in order to minimise further conflict with the developer (Barrow, 2010; de Rijke, 2013a).

Since communities can rarely afford to commission their own impact assessments, to hire specialist consultants and lobbyists, it has been a well-tried tactic of the oil and gas industry to exploit this structural advantage (Short et al., 2015; Watterson & Dinan, 2016; Witter et al., 2013). It is therefore critical to examine whether the industry's expertise has not downplayed the risks and potential harms while exaggerating the benefits.

1.2.4 Need for social science contribution

The recent scholarly interest in the actual and potential environmental impacts of unconventional gas extraction has not been matched by the same level of attention in the interconnected area of social effects (Jacquet, 2014).

Table 1.1. Ten impact studies and reviews of shale gas developments in the UK and the profile given to potential social impacts

Body, date and title of the study/review	Primary focus	Profile for SIA	Considered pathways	Local community involvement	Potential adverse social effects	Potential positive social effects
Cuadrilla, Sept. 2011: "Economic Impact of Shale Gas Exploration & Production in Lancashire and the UK"	Economic	Low	Employment	No		Moderate in respect to the number of FTEs generated
The Royal Society and The Royal Academy of Engineering, June 2012: "Shale gas extraction in the UK: a review of hydraulic fracturing"	Safety and environmental	Low	Water contamination, well integrity, induced seismicity, leakages of gas, water and waste management	No	Minor and likely to be mitigated by appropriate practices and regulation	
The Institute of Directors, 2013: "Getting shale gas working"	Economic and environmental	Low	Employment	No		Significant in respect to employment and possibly power generation
DECC, Dec. 2013: "Strategic Environmental Assessment for Further Onshore Oil and Gas Licensing: Environmental Report"	Environmental	Low	Noise, dust, vibrations, vehicle movements, emissions to air, ground- and surface-water contamination, employment	No	Generally minor but potentially significant in respect to community disturbance and health under the high activity scenario	Significant in respect to employment and community benefits
European Commission, Jan. 2014: "Commission staff working document: Impact assessment… Exploration and production of hydrocarbons..."	Environmental and climate	Low	Legal uncertainty, employment	No, but held a public internet consultation (not specifically local but open to local residents)	Generally minor in public and occupational health and safety but significant in respect to public acceptance	Employment and revenues; lower than in the US in respect to gas prices

DEFRA, March 2014: "Shale Gas: Rural Economy Impacts"	Economic, social and environmental	Medium	Employment, services, energy, tourism, congestion, housing, water contamination, noise, light, landscape	No	Potentially significant, e.g.: loss of business, impacts on tourism, raising rents, lower property resale prices, health impacts	Potentially significant but uncertain due to questions of sustainability
Cuadrilla, May 2014: "Environmental Statement" (Temporary Shale Gas Exploration, PNR and Roseacre)	Economic	Low	Employment, wider economy, public access, crime and public safety	Yes but no evidence of community contribution to the EIA	Non-significant in respect to the loss of local amenity, traffic, influx of population, crime, public safety, protest	Mainly none or minor to moderate in the exploratory stage in respect to employment, opportunities for local businesses, generating new local expenditure, community benefit payments
Public Health England, June 2014: "Review of the Potential Public Health Impacts of Exposures to Chemical and Radioactive Pollutants as a Result of the Shale Gas Extraction Process"	Health	Low	Groundwater contamination, spills of fracking fluids and wastewater, emissions to air	No	Low when properly run and regulated but cumulative impacts of many wells – potentially greater	
Lancashire County Council, Sept. 2014: "Overview report: HIA work concerning planning applications for temporary shale gas exploration"	Health	High	Emissions to air, noise, dust, light, occupational exposure to airborne silica, unplanned incidents, induced seismicity, ground- and surface-water contamination, spills and leakages, emissions from waste and flowback water, vehicle movements	Yes	Significant in respect to residents' health and well-being	

Medact, 2015: “Hydraulic Fracturing: The impacts and opportunity costs”	Health	Medium	Emissions to air, contamination of ground- and surface-water, vehicle movements, dust, noise, odours, light, disruption to the social fabric of communities and ecosystems, greenhouse gas emissions, climate change	No	Significant in respect to human health and well-being	Low in respect to gas prices and as a transition fuel but uncertain in respect to climate change

As in many EIAs worldwide, the existing assessments of environmental impacts of fracking in the UK do not systematically refer to relevant social science literature or theory; rarely is there any primary and empirical research conducted when preparing those impact assessments (see Table 1.1) and the vast majority of experts providing information and their opinions on the issue of shale gas exploration and extraction do not specialise in the social sciences.

Engineers and other technical experts can provide their predicted measurements but are not in the position to assess the likely social impact associated with, for example, the noise, light or change in the landscape. Social scientists, on the other hand, also have to be careful in their analyses since some of the affected communities may try to exaggerate the likelihood or level of the impact (Baines et al., 2003).

The exclusion of a particular field of science (the social sciences in this case) has very real consequences for the assessment of what constitutes acceptable development; for example, the current EIA practice does not incorporate questions of distributional inequality and democracy. Furthermore, the technocratic and 'material' focus of the planning authorities and related assessments could create a sense of institutional betrayal (Gunter & Kroll-Smith, 2006) or a 'spiral of distrust':

> The missing link is at the point where public agencies exclude the emotional/irrational "stuff" the public offers, seeing it as non-data. Agencies may even take specific measures to avoid the 'non-data'… while their public is deciding to oppose projects based on that "non-data." In a deepening spiral of distrust, the agency's disregard of the public's emotional "non-data" leads to the public viewing the agency's "rational" data as irrational. (Firth in Stolp, 2003, p. 246)

However, from a sociological and anthropological point of view the 'rationality' of any particular expert extends only as far as their individual value orientations and the orientations they share with other members of their discipline. The use of social data is therefore just as legitimate as other types of data (Stolp, 2003).

Given the long-term impacts that can result from what at the time appears to be purely 'material' considerations, the social aspects of any development, and of fracking in particular, call for special attention. The need for the social sciences to contribute to questions of the future of energy is especially pertinent in the light of the emerging consensus among scholars that: 'Given the fast pace of technical innovation, the blockages to responding effectively to the enormous energy challenges facing us all are fundamentally cultural and political rather than technological' (Strauss, Rupp, & Love, 2013, p. 10).

1.2.5 Progressing our understanding of the social impacts of fracking

Many of the social impacts of fracking can and should be assessed. This study emphasises the grassroots knowledge that does not appear in official documents but is essential for formulating and evaluating the actual social impacts and the experiences of the development. Local stakeholders and residents know much about the existing values and activities in their communities and are in a unique position to provide insight into the potential impacts of fracking and to help us understand how and why particular impacts arise. The grassroots knowledge in this project was only accessible through intensive, long-term, qualitative and ethnographic research.

By documenting the ways in which shale gas developments are either similar to or different from earlier resource developments, we can find out how useful the 'boomtown' literature describing the natural resource booms in the 1970s and 1980s will be for assessing the potential consequences of fracking (Krannich, 2011). Evidence from the US suggests that despite the different technologies and evolving characteristics of natural resource extraction, communities are experiencing many of the same social impacts documented in earlier boomtown studies (Schafft, Glenna, Green, & Borlu, 2014).

The National Policy Statement for Energy (Department of Energy and Climate Change, 2011) which sets out the national policy for the energy infrastructure in the UK, implicitly refers to boomtown research and states that a socio-economic assessment should consider, inter alia, a change in population dynamics due to the influx of workers and effects on social cohesion.

We need to progress our understanding of the social impacts of fracking in order to avoid making the error of treating the 'the absence of evidence of harm' as 'evidence for the absence of harm'.

Energy transitions play a profound role in shaping societies. A transformation from one energy source to another results in deep societal and political transformations (Melosi, 2010; Miller, Iles, & Jones, 2013; Mitchell, 2011). By studying the social aspects of this transformation in the making, we can progress our understanding of the current conditions and dimensions of social change, especially in such areas as democracy and public attitudes towards renewable energy.

1.3 What is social impact assessment (SIA)?

1.3.1 This study

In this study, assessing the social impacts of fracking means examining the ways in which social, psychological, health and political change processes associated with shale gas developments are impacting (and are likely to impact) the daily lives, beliefs, values and community dynamics in Lancashire. The conclusions draw upon a robust and interdisciplinary literature review in order to assess the significance and likely future direction of the changes that the local residents and other stakeholders have experienced. The study discusses some of the most significant changes that are anticipated by members of the local community and what this tells us about the social impacts of resource extraction developments in the UK. The cases analysed in this study serve to illustrate a broad range of general social issues related to shale gas extraction even though they mainly pertain to the particularities of Cuadrilla's activities in Lancashire as well.

In general terms, the aims of this study are encapsulated in the most commonly accepted definition of SIA as:

> the process of analyzing (predicting, evaluating and reflecting) and managing the intended and unintended consequences on the human environment of planned interventions (policies, programs, plans, projects) and any social change processes invoked by those interventions so as to bring about a more sustainable and equitable biophysical and human environment. (Vanclay in Vanclay, 2003, p. 2)

This study: (1) predicts the possible future impacts if shale gas developments are permitted in Lancashire and (2) evaluates the social impacts that the actual and proposed developments have already had on a range of local stakeholders.

1.3.2 The concept in history

Although predicting and assessing social change as a result of development has arguably been part of the political life since antiquity, social impact assessment, as a separate concept, originated around the late 1960s-1970s (Vanclay, 2003, 2015).

Since it emerged as a separate field, empirical work done for SIAs looked at a broad range of social effects. A particularly frequent focus of SIAs have been large-scale energy development projects in rural areas (Freudenburg, 1986a).

Today, the main role of SIAs is to provide relevant and detailed information to decision-makers so that it can be ensured that the benefits of the developments are maximised and the costs are minimised.

Due to an SIA's participatory nature, more consideration is given to the characteristics of the communities and the environment. By assessing the likely effects, SIAs often provide information about the introduction of appropriate mitigation measures, prompt

redesigns, offer early warning and establish causation.

SIAs are interdisciplinary studies incorporating such fields as: anthropology, sociology, development studies, rural and social history, gender studies, social and cultural geography, political science, human rights, economics, environmental and planning law, criminology and community psychology (Esteves, Franks, & Vanclay, 2012). The general consensus seems to be that no social impact assessment should be limited to an analysis of only economic and demographic variables (Freudenburg, 1986a).

There are various strands in the SIA field. In addition to ethnographic and qualitative research, there have also been efforts to design more formalised models and methods (see, for example, Burdge, 1987, 2003, 2004) that involve quantitative data and modelling to a larger extent. In the context of this research project, however, secondary and quantitative data concerning the social impacts of shale gas developments in Lancashire were still often unavailable at the time.

1.3.3 Good practice

There is no universal standard for SIAs (Vanclay, 2003), although there are some commonly accepted principles and definitions, particularly those that have been formulated by the International Association for Impact Assessment (IAIA) (Vanclay, 2015). They outline what the IAIA considers to be current good practice in social impact assessment.

Unlike EIAs and some HIAs, SIAs do not have to focus on measurable impacts. The precise determinants of every resource extraction project are situation- and culture-specific and have to be examined in the particular social, political, economic and historic context of the impacted community. This means that an SIA may lack operational definitions for many constructs (Vanclay, 2002) such as power or community. Its broad scope, however, also means that there is less potential for concentrating only on politically convenient indicators or averages that may obscure the changing nature of the underlying social processes (Brasier et al., 2014).

1.3.4 Definitions

SIAs build on a wide understanding of the concept of 'social', which encompasses all human impacts such as: aesthetic, climate change, community, cultural, demographic, development, distributional, economic, gender, health, infrastructure, institutional, political, psychological, impacts on businesses, agriculture and tourism, values and vulnerabilities (Vanclay, 2002).
Some environmental impacts can also be social impacts because people may form an attachment to places or depend on the environment for their livelihoods. The loss of tranquillity and important habitats can also constitute social impacts because they are valued by people. Landscapes are cultural phenomena and any changes in the landscape alter the way people experience and imagine the places they inhabit (Willow, Zak, Vilaplana, & Sheeley, 2014).

The good practice of SIA treats social, economic and biophysical impacts as being inherently interconnected. The impact pathways (see Table 1.1) help us understand how changes in one domain trigger an impact in the social domain. These changes can be direct, but consideration should also be given to indirect and cumulative impacts (Vanclay, 2015).

'Social impact' refers to impacts that are actually experienced or felt by people in the physical/corporeal or perceptual/emotional sense. This study takes as a starting point the understanding that different people have different thresholds of observation and tolerance, different sensory sensitivity, different occupational patterns (Baines et al., 2003) as well as different abilities to manage possible impacts. Therefore, there may be 'different levels of risk [experienced] from the same hazard' (Oliver-Smith in Willow et al., 2014, p. 241). The nature and significance of the social impacts that people experience are also varied and caution should be exercised if they are to be universalised or labelled as non-significant.

This variability in people's experiences regarding a resource extraction project and

their perceptions of the impacts are also influenced by the stage in the development, its proximity to the residences and the extractive and development history in the area (Brasier et al., 2011).

It would be difficult to claim that the perspectives on the social impacts that are endorsed by decision-makers, professional consultants or the industry are superior to the perspectives of the citizens. All perspectives and kinds of information must be taken into account if a meaningful analysis of social impacts is to take place.

The impacts can be experienced at the level of an individual, household, community, group or society as a whole (Barrow, 2010; Vanclay, 2002). Perceived impacts are by definition also relevant social impacts (see Box 3.1) because regardless of which opinions are accepted in the mainstream discourses or whether they have a solid foundation, people tend to respond according to their own perceptions and fears (McCoy, 2016; Rappaport, 1994). Fear and anxiety are real social impacts and should not be dismissed (Vanclay, 2015). Social dynamics regarding trust and credibility are also crucial for measuring social impacts and risk (de Rijke, 2013b).

SIAs examine both the positive and negative impacts of a development as experienced, perceived or anticipated by the relevant stakeholders.

This study adopts a 'social' understanding of fracking, akin to the ways in which the term is used in popular discourse rather than in industry or technical jargon, where it refers very narrowly to a particular stage in the shale gas development process. Here, fracking also encompasses the planning and exploration processes as well as all other industrial elements of hydraulic fracturing, such as truck traffic, waste disposal and the use of huge quantities of water (Short, Elliot, Norder, Lloyd-Davies, & Morley, 2015).

1.3.5 Equity issues

An assessment of the social impacts of fracking should document stories and give a voice to people who may otherwise remain unheard (Willow & Wylie, 2014). The IAIA principles of SIA underline the importance of equity issues: 'The goal of impact assessment is to bring about a more ecologically, socio-culturally and economically sustainable and equitable environment' (see Box 1.1). The differential distribution of impacts among different groups in society is one of the prime concerns of SIA (Vanclay, 2003).

> The role of SIA goes far beyond the ex-ante (in advance) prediction of adverse impacts and the determination of who wins and who loses. SIA also encompasses: empowerment of local people; enhancement of the position of women, minority groups and other disadvantaged or marginalised members of society; development of capacity building; alleviation of all forms of dependency; increase in equity; and a focus on poverty reduction. SIA complements the economic and technical models that characterise the thinking of many development professionals and agencies. (Vanclay, 2003, p. 3)

SIA is process-oriented and should ideally create participatory and deliberative spaces to facilitate community debate about the proposed developments. The methodology of SIA is more than a technique of conducting socially relevant research. It is also a philosophy about development and democracy (Vanclay, 2002) that puts centre stage the issues of democratisation, free, prior and informed consent as well as the improvement of lives of the worst-off members of the impacted communities (de Rijke, 2013a).

Gender is a core social impact issue because women often bear the largest social impact but are rarely the most direct beneficiaries of many resource extraction projects. Gender-blind assessments also work to the disadvantage of women because their assumptions stem from the existing structures that are characterised by gender inequality (Srinivasan & Metha, 2003; Vanclay, 2002). That is why an explicit consideration of the social impacts on women is required.

1.3.6 SIA and regulation

SIA (usually as part of EIA) is widely practised internationally as a contributing study that is considered as part of the regulatory approval process for resource extraction projects (Esteves et al., 2012). Despite the fact that SIA has been widely used in other countries and advocated in the UK, as of today (July 2016) British institutions have not introduced a requirement for this practice in the national regulations (Walker, 2010).

The recent EU Directive on the assessment of the effects of certain public and private projects on the environment (2014) for the first time requires that member states conduct the environmental impact assessment in such a way that they identify, describe and assess in an appropriate manner the direct and indirect significant effects of a project on the 'population and human health' ('Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014,' article 3). The Directive was expected to be transposed into UK legislation by spring of 2017. Although the Directive does not require states to conduct full-fledged SIAs, it shows the general direction in which the impact legislation in the EU is moving. The results of the Brexit referendum may mean that the UK will create an entirely new set of regulations regarding fracking, whose precise shape is currently unknown.

1.4 Benefits of SIA

An assessment of social impacts in general and in this study in particular can:

- document and bring forward citizens' concerns about a particular project and hence contribute important information to good and effective decisions and to a resolution of conflicts;
- gather and validate local knowledge about the state of social and biophysical environments;
- inform the broader public and policy debate about the spectrum of significant and relevant impacts associated with shale gas developments;
- work towards the explicit recognition by decision-makers of the relevance of systematic information regarding social impacts as a data source at a time of rapid decision-making for shale gas extraction projects;
- provide valuable guidance and regulatory insight by broadening the scope of the impact assessment process and elevating social issues onto many levels of policy decisions;
- ensure that the projects contribute to the advancement of communities, social development and improve the outcomes for society as a whole;
- draw attention to how the projects' risks and opportunities are unevenly distributed by combining empirical research with other forms of local and professional expertise;
- contribute to comprehensive and workable solutions for abating disproportionate risk and social impacts;
- reduce the projects' risks by providing input in designing plans and mitigation measures;
- inform and involve a range of stakeholders to assist in building mutual understanding and trust;
- significantly contribute to the UK's and to worldwide efforts to achieve sustainable development;
- contribute a robust study to the emerging social science literature in unconventional gas developments.

Box 1.1. Core values and key principles of SIA from: Vanclay, F. (2003). International Principles For Social Impact Assessment. Impact Assessment and Project Appraisal, 21(1), 5–11.

Core values

1. There are fundamental human rights that are shared equally across cultures, and by males and females alike.
2. There is a right to have those fundamental human rights protected by the rule of law, with justice applied equally and fairly to all, and available to all.
3. People have a right to live and work in an environment which is conducive to good health and to a good quality of life and which enables the development of human and social potential.
4. Social dimensions of the environment – specifically but not exclusively peace, the quality of social relationships, freedom from fear, and belongingness – are important aspects of people's health and quality of life.
5. People have a right to be involved in the decision making about the planned interventions that will affect their lives.
6. Local knowledge and experience are valuable and can be used to enhance planned interventions.

Principles specific to SIA practice

1. Equity considerations should be a fundamental element of impact assessment and of development planning.
2. Many of the social impacts of planned interventions can be predicted.
3. Planned interventions can be modified to reduce their negative social impacts and enhance their positive impacts.
4. SIA should be an integral part of the development process, involved in all stages from inception to follow-up audit.
5. There should be a focus on socially sustainable development, with SIA contributing to the determination of best development alternative(s) – SIA (and EIA) have more to offer than just being an arbiter between economic benefit and social cost.
6. In all planned interventions and their assessments, avenues should be developed to build the social and human capital of local communities and to strengthen democratic processes.
7. In all planned interventions, but especially where there are unavoidable impacts, ways to turn impacted peoples into beneficiaries should be investigated.
8. The SIA must give due consideration to the alternatives of any planned intervention, but especially in cases when there are likely to be unavoidable impacts.
9. Full consideration should be given to the potential mitigation measures of social and environmental impacts, even where impacted communities may approve the planned intervention and where they may be regarded as beneficiaries.
10. Local knowledge and experience and acknowledgment of different local cultural values should be incorporated in any assessment.
11. There should be no use of violence, harassment, intimidation or undue force in connection with the assessment or implementation of a planned intervention.
12. Developmental processes that infringe the human rights of any section of society should not be accepted.

2

METHODOLOGY AND RESEARCH APPROACH

This study documents and analyses the potential and current social impacts of shale gas developments in Lancashire, UK, with primary data derived from ongoing anthropological fieldwork, including interviews and observations done in the area over the past twelve months.

2.1 Aims and scope

The objectives of this study were to:

- establish, analyse and assess the significance of experienced and likely social impacts of shale gas projects in Lancashire;
- identify the affected communities and potential distributional inequalities across different groups in the population;
- understand the relationship between natural resource development and social, psychological, health and political outcomes;
- underscore the relevance of social impacts for determining the proposed shale gas developments in the area and political decision-making in the UK.

The scope of the study was identified as including direct, indirect and cumulative social impacts on the affected communities. For the purposes of this assessment and in line with a basic premise in the social sciences, it was the research participants rather than the researcher-outsider who defined group membership according to their own

perceptions of what constituted meaningful community beliefs and actions (Chase, 1990). Furthermore, the potentially affected populations in this study are also defined broadly in order to include people who do not actually live in the vicinity of the potential fracking sites but nonetheless form a coherent community in the social sense, i.e. they feel that they would be potentially affected by the projects. This includes, for example: drill rig workers, tourists, non-local families and the friends of residents living near a project site as well as members of regional, national and international campaign groups. This approach is based on an argument advanced, for example, by Freudenburg and Davidson (in Boudet, Bugden, Zanocco, & Maibach, 2016) who have claimed that, especially in rural areas, people's views about a particular development can be shaped by the development's implications for their relatives, friends or neighbours.

Shale gas exploration in Lancashire is often perceived as a national test-case for fracking so it is important in the light of future developments elsewhere. Additionally, even if the main activities were limited to one county, other areas of the UK may still be affected by, for example, silica sand mining (e.g. Cheshire) and wastewater transport and management. The relevance of research on shale gas is, therefore, not limited to the immediate areas where the resource can be extracted.

Although the relevance of the study's findings is not limited to those residents who live in the vicinity of the shale gas projects, the empirical data was collected largely in Lancashire, and all study participants were local residents. The aim was to investigate and describe the actual experience and perceptions of the host communities in the vicinity of actual and potential fracking sites. The assessment of social impacts of shale gas projects required an understanding of how the local people perceive and make sense of the effects of fracking. This local knowledge was then essential in order to expand on how the 'experts' understood those effects.

Instead of a one-sided assessment of the degree of impacts by the researcher, detailed ethnographic fieldwork was undertaken among the local residents in order to gain an understanding of their values and opinions about the significance of possible changes to their lives, their well-being and the environments with which they interact. The findings are therefore based on a large sample of individual and collective perceptions of the impacts. The study's approach to 'perceived impacts' was elucidated in the previous section. In places where the assessment tries to identify the extent to which a given 'perception' is widespread among the members of the local communities, this is on the basis of ethnographic research and, where possible, it is also supported by information from other sources or the literature. However, more quantitative research would be needed to assess the statistical representativeness of those perceptions for the entire populations of the Fylde or Lancashire. Nevertheless, the approach applied here has been useful in describing issues and experiences that are important for the vulnerable members of the local communities as well as the people who have been most active in the shale gas issue. Their voices might have been lost in a more statistically representative study.

Risk is a culturally perceived and socially constructed concept, which means that people's understanding of danger can vary greatly within and among groups and populations and may not always be easily quantifiable (Jacquet, 2014). In the case of fracking, however, the cultural and social perceptions of risk are also often 'made real' by scientific and expert quantification data as well as the grassroots' own analysis of the possible dangers. The changing legalities and heightened awareness of danger through the media (also social media) (Cartwright, 2013) interact to create a particular understanding of risk that is neither only 'perceived' nor universally recognised. Conflicting scientific reports and regulatory investigations raise public and scholarly doubts about the 'real' impacts of fracking and contribute to the already highly contested terrain over the best available information and evidence regarding shale gas developments (Perry, 2012a). Independent studies of impacts of large extraction projects may be the best option, as research on the history of and problems with science sponsored by powerful corporations

has aptly demonstrated (Banerjee, Song, & Hasemyer, 2015; Kirsch, 2014).

Although most of the shale gas activities in Lancashire and the UK concern exploratory drilling and not full-scale production, a proper social impact assessment cannot reasonably be limited only to that phase for a number of reasons. First, such a full assessment has not yet been conducted and there is a need to fill this knowledge gap. Secondly, Cuadrilla's exploratory activities in Lancashire are integral to their intention to develop production at scale, which is borne out by the declarations of the government and the industry about their determination to establish commercial shale gas production in Lancashire and the UK. Exploration is the first step, but it is very likely that it will be followed by extraction. The level of detail provided in the company's planning applications as well as the duration and results of the extensive planning and appeal processes will most likely have a bearing on any future applications for full-scale gas production in Lancashire as well as in the UK. Consequently, public understanding of the risk of fracking is related to the prospect of commercial shale gas production at scale and not solely to exploration for shale gas.

2.2 Data collection methods

The findings of this study derive from:

- in-depth fieldwork in Lancashire over twelve months with the author living within five miles of the potential and actual fracking sites;
- qualitative and semi-structured interviews conducted between June 2015 and April 2016;
- written evidence and submissions made during the planning process as well as feedback responses from public consultations;
- a photovoice exhibition;
- a review of relevant academic and non-academic literature;
- a review of media and social media reporting on shale gas developments in the UK and worldwide.

2.2.1 Ethnographic and participatory action research

During 2015-2016, the author attended the meetings and events of the local planning authorities, Public Inquiry hearings, local grassroots anti-fracking groups and national regulatory agencies. Where direct participation was not possible, the analysis draws on publicly available video recordings of the events.

The representations made by the interested parties and the discussion during the meetings of the Development Control Committee at the Lancashire County Council (LCC) between 23rd and 29th June 2015 as well as representations made by the local residents and a cross-examination of expert witnesses during Public Inquiry hearings in February and March of 2016 in Blackpool were transcribed. In addition to being a valuable source of expert advice on the acceptability of shale gas exploration and production in Lancashire, these representations were also in-depth, first-person accounts of the residents' experiences of and perspectives on fracking. As such, they were treated as useful primary data for the analysis of social impacts of shale gas developments.

During participant observation, extensive field notes were taken within 24 hours of all events and visual documentation was made at the public meetings and protests.

A photovoice exhibition was organised in February 2016. It constituted the participatory action element of this study and collated the photographs and stories of the local residents. The theme of the exhibition was 'Through Our Eyes' and it documented in visual as well as textual form the effects that the local residents have already experienced from shale gas developments in the area. The contributions answered the question of what it meant to live with the prospect of fracking. The exhibition was well attended and the photos have subsequently been also exhibited at the International Sociological Forum in Vienna, Manchester Metropolitan University at the Alternative Futures and Popular Protest conference as well as at a local café in Lytham.

The researcher's reception in the field was good, though not without initial suspicion. Subsequently, however, it remained good

throughout data gathering and enabled the collection of valuable and in-depth material.

In line with the best practice in social research, all interviewees and some of the other participants had the right to check how they were quoted in this study and could request to make changes.

2.2.2 Interviews

In-depth, semi-structured interviews were conducted with 28 individuals who were largely selected through snowball sampling. The interviewees were all residents in Lancashire and some (but not all) of them were active members of local groups campaigning against shale gas exploration in Lancashire or fracking in general, such as: Ribble Estuary Against Fracking (REAF), Residents Action On Fylde Fracking (RAFF), Frack Free Lancashire (FFL), Preston New Road Action Group (PNR), Roseacre Awareness Group, Singleton Against a Fracked Environment, Defend Lytham and Lancashire Nanas. Some of the interviewees were parish and county councillors.

Snowball sampling involved the selection of future interviewees on the basis of referrals from their acquaintances. The sampling method is particularly helpful in gathering data from hidden and not-easy-to-reach populations, including the most vulnerable members of a studied community. It is also often used to research community networks and to gather expert information, both of which were particularly relevant in the case of this study.

The interviewees received informed consent forms as well as information sheets regarding this research. The interviews were digitally recorded and transcribed verbatim. The participants were offered a copy of the digital recording. All transcripts were anonymised to protect the identity of the interviewees.

Cuadrilla Resources were approached twice with a request for an interview but declined. This was not entirely unexpected and similar difficulties were faced by other researchers (Brasier et al., 2011). Other scholars have also pointed out that it is extremely unlikely that a researcher could develop a relationship of trust with both sides of the debate at the same time (Simonelli, 2014). Since the author was referred to a public affairs and communications agency acting on behalf of Cuadrilla, it is not very likely that an interview would reveal any new themes. The planning officer in charge of the PNR and Roseacre applications at the Lancashire County Council was also asked for an interview but declined as well. North West Energy Task Force (NWETF) – a pro-shale gas network supported by Centrica Energy and Cuadrilla Resources – were contacted and an effort was made to reach out to a prominent member of the organisation but there has been no response. Additionally, various employees of drilling companies (likely to be involved in shale gas exploration and extraction in Lancashire) were repeatedly sent interview requests but no response was received. The landowners of one of the potential exploratory drilling sites were asked for an interview but declined as well. However, a preliminary draft of a part of this study was shared with them prior to publication to verify some of the relevant aspects. No response has been received.

The study is based on empirical and qualitative data but, as a scholarly work, it does not (and does not have to) follow the journalistic practice of portraying contested issues in a polarised manner and according to each of the sides the same weight (Hudgins & Poole, 2014). Instead, what emerges from this study is an analysis of complex social realities and representations. The analysis pays attention to the uneven political, social and economic power and to the imbalanced terrain of hegemonic discourses.

2.2.3 Review of the relevant literature

This study reviewed:

- a large number of publicly available representations and letters sent to the LCC in relation to shale gas applications in Lancashire;
- publicly available proofs of evidence as well as other core documents submitted to the Public Inquiry in Blackpool;
- publicly available feedback responses to public consultations conducted by Arup on behalf of Cuadrilla in July 2013

as well as feedback forms from Public Information Day in November and December 2013;
- peer-reviewed academic literature;
- non-academic literature as well as reports by various state agencies, private consultants and organisations;
- social media and websites with information on shale gas-related issues in the UK and worldwide;

In total, this study directly references around 220 of the many more literature positions reviewed for this research. Instead of dividing the assessment into separate sections for the literature review and empirical findings, the data is triangulated from multiple sources and research methods throughout the study. An array of social impact research studies that have focused on other forms of natural resource development and other extraction technologies contains important findings regarding community change and was used throughout this study to inform the assessment of the current and likely social effects in the context of shale gas projects.

2.4 Coding

Interview, observational and literature data was imported into NVivo 11 Pro for coding and thematic analysis. The transcriptions, interviews and literature were open-coded for perceptions of social impacts with a particular focus on code categories from related research about 'boomtown' developments and fracking in the US and Australia as well as on emerging themes as the research progressed.

2.5 Ethics

The Data Protection Official for Research and Norwegian Social Science Data Services were notified about the research project and it obtained ethical clearance from the EU.

2.6 Limitations

The study has the following limitations:

- the findings are not exhaustive but include sufficient details to reach general conclusions about the social impacts of shale gas developments in the UK;
- more quantitative research would be needed to reach definitive conclusions about the representativeness and prevalence of the experiences and issues described in this study;
- there has been no baseline study on social attitudes to extraction projects in the area prior to 2011 and the impacts described in the study have so far been short-term, so more follow-up research would be needed in the future to assess how long lasting the described social impacts would have been and how much activity would have actually occurred;
- industry perspectives that were publicly available were included in this study but more empirical research would be beneficial along with the inclusion of the perspectives of drill rig workers;
- the research has only been able to consider the effects through the planning and (for some fracking sites) the early construction and exploratory phases of shale gas developments in Lancashire. Yet it is important to analyse both the actual, early effects alongside the potential cumulative and long-term impacts of commercial shale gas production at scale.

3

SOCIAL WELL-BEING and HEALTH

The UK's National Planning Policy Framework (NPPF) states that when local authorities grant planning permission for mineral development they should ensure that there are no unacceptable adverse impacts on human health (Department for Communities and Local Government, 2012).

Since 1948, the acting definition of health as formulated by the World Health Organisation (WHO) states that health is 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' (World Health Organization, 1948, p. 100). Additionally, WHO have defined health promotion as 'the process of enabling people to increase control over, and to improve, their health. [Health promotion] moves beyond a focus on individual behaviour towards a wide range of social and environmental interventions' (World Health Organization, 2016).

This comprehensive understanding of health was also adopted by the director of public health at the LCC, who conceded during a debate at the Development Control Committee on 24 June 2015 that while environmental monitoring of fracking activities is undertaken by various agencies, public health depends not only on environmental but also on social and economic factors. These factors, however, as far as he was aware, were not being monitored by any agency.

In line with the above, this study adopts a comprehensive and holistic approach to health that links the social, economic and political

determinants of health with the natural environment. Given such an interpretation, it is evident that shale gas developments have the potential to create significant human health impacts.

The social impacts can have significant effect on health and well-being (Clougherty & Kubzansky, 2009; Diez Roux, 2001). A rigorous analysis of human health impacts of shale gas activities in Lancashire, therefore, has to combine an assessment of social, economic and psychological well-being as well as the physical, geological and biological environments. Impacts on health and social well-being can occur through a range of pathways: from direct environmental (air-borne pollutants, noise, traffic congestion, etc.) to pathways associated with changes in the community (Gee & Payne-Sturges, 2004).

The ways in which people perceive and respond to health threats can vary and are heavily determined by a wide array of social, psychological, economic, cultural and political factors, such as the level of trust in the regulatory regime and political elites, prior experience of the industry or people's understanding of safety, all of which are important determinants of health that have not yet been adequately assessed (Ben Cave Associates Ltd., 2014b).

Residents living close to the actual and potential fracking sites internalise their environmental concerns, e.g. about water and air pollution, in relation to the social and economic contexts of their communities (Jacquet, 2014). Researchers have found that there can be a dramatic increase in stress and mental health issues experienced in communities affected by rapid energy development even if there is only minimal or no risk of adverse impacts in the area (Bacigalupi & Freudenberg, 1983; Kassover & McKeown, 1981). Social processes can lead to the amplification of risk and amplify certain impacts if a project is seen as socially undesirable or unwanted and people are anxious or unhappy about it (Vanclay, 2015) (see Box 3.1). Hence, stringent regulatory regimes and robust mitigation measures that aim to minimise the risk of pollution or accidents may not be sufficient to alleviate the fear and to reduce the level of perceived risk by the residents.

Box 3.1

Community understanding of risk*

The Social Amplification of Risk Framework (Kasperson et al., 1988) helps to answer the question about the frequent discrepancy between technical assessments of risk (based on probability and magnitude measures) and community understanding of risk (based on a fuller range of issues and concerns). The framework links the technical assessment of risk with the psychological, sociological and cultural perspectives of risk perception.

The ways in which information about the risk is transferred as well as the responses it elicits may lead to either the amplification or attenuation of risk perceptions.

This is how the authors of the framework describe the problem:

The technical assessment of risk typically models the impacts of an event or human activity in terms of direct harms, including death, injuries, disease, and environmental damages. Over time, the practice of characterizing risk by probability and magnitude of harm has drawn fire for neglecting equity issues in relation to time (future generations), space (the so-called LULU or NIMBY issue), or social groups (the proletariat, the highly vulnerable, export of hazard to developing countries). It also has become apparent that the consequences of risk events extend far beyond direct harms to include significant indirect impacts (e.g., liability, insurance costs, loss of confidence in institutions, or alienation from community affairs). The situation becomes even more complex when the analysis also addresses the decision-making and risk-management process. *Frequently, indirect impacts appear to be dependent less on the direct outcomes (i.e., injury or death) of the risk event than on judgements of the adequacy of institutional arrangements to control or manage the risk, the possibility of assigning blame to one of the major participants, and the perceived fairness*

of the risk-management process. (Kasperson et al., 1988, p. 179 emphasis added)

An analysis of social impacts from industrial accidents shows that the technical assessments of risk greatly underestimate the scope and scale of higher-order impacts from risk events. Social amplification is therefore a corrective mechanism by which public understanding of risk is brought to bear on the narrow parameters of technical assessment and brings it more in line with the actual, fuller determination of risk.

*Since this research has noted that 'perception' can have a pejorative meaning in the popular and technical parole connoting 'non-real' or 'non-significant', for this project it was preferred to use the much more appropriate term of popular or community understanding of risk.

There is therefore a need to articulate clearly and to understand the reasons for the increased stress and health problems in the communities affected by shale gas developments. The character of social change experienced by the affected communities that influences social well-being and health is multidimensional and not easily quantifiable. Additionally, it is important that the cumulative effects of seemingly small changes are taken into consideration because they may also result in possibly significant health impacts.

To gain a full picture of the impact on health and well-being, it is also crucial to take into account the cumulative impacts of multiple types of disturbance, nuisance and community anxiety as well as the inequalities in health in the populations potentially affected by fracking.

The health impact assessment undertaken for the LCC revealed that the local residents were concerned that the impacts on health and well-being would be, inter alia, cumulative, long-term and irreversible. They also did not believe that the shale gas activities would have any positive effects on the local communities (Ben Cave Associates Ltd., 2014a). In general,

> the over-riding responses about the two proposed exploration sites voiced by members of the local communities who attended the workshops were those of fear, anxiety and stress, which are affecting their mental wellbeing, with some people experiencing sleep disturbance and depression. (Ben Cave Associates Ltd., 2014b, p. 55)

This current research has confirmed that the fear and stress regarding the potential effects of shale gas exploration and extraction on social well-being in the local communities in Lancashire are considerable (Ben Cave Associates Ltd., 2014a; Jacquet, 2014), lead to and exacerbate a range of health impacts (the details are presented in the subsequent sub-sections of this study). Psychosocial stress can link social conditions with environmental hazards and lead directly to illness or acute or chronic changes in the functioning of the body's immune and other systems (Gee & Payne-Sturges, 2004).

Grassroots organisations may positively influence individual and group resilience and coping strategies, but if they are unable to counterbalance the social and economic stressors (such as uncertainty about the future or worry about pollution), community-level vulnerability translates into individual vulnerability and can result in illness and stress. Environmental, social and economic stressors can cause illness through neuroendocrine pathways by causing stress and anxiety which weaken the body's ability to defend itself against external challenges (Gee & Payne-Sturges, 2004; McCoy, 2016; National Mental Health Development Unit, n.d.).

The significant majority of the many hundreds of peer-reviewed publications on the impacts of fracking indicate the potential adverse consequences of shale gas developments. There are, however, still some gaps in knowledge due to the newness and incomplete understanding of the technical process of high volume hydraulic fracturing and the toxicity of the potential pollutants used in the process, an insufficient time period that elapsed to be able to design meaningful longitudinal studies of fracking, the lack of comprehensive baseline data and so on. Furthermore, due to the different geology of the shale formations, different population densities, the operating practices of fracking companies, etc.,

the results of any study may not be easily generalised. Another problem is that without well-designed epidemiological studies it may be difficult to demonstrate incontestable cause-and-effect relationships (Finkel & Hays, 2015). Despite these uncertainties but given even the fragmentary evidence we have today, the broad agreement of the health and international community seems to be that the potential adverse health impacts associated with fracking require that companies and decision-makers take a very cautious approach (Ben Cave Associates Ltd., 2014b; Finkel & Hays, 2015; Kibble et al., 2014; McCoy & Saunders, 2015; New York State Department of Health, 2014; UNEP, 2012).

3.1 Equity, social and economic domain of health determinants

Fylde is the borough where most of Cuadrilla's activities in Lancashire have taken place (the company also had one site in Becconsall in the West Lancashire borough). According to the 2015 health profile for Fylde, overall deprivation is lower than the England average but there are some meaningful disparities in that the life expectancy is 6.7 years lower for men and 8.4 years lower for women in the most deprived areas of Fylde than in the least deprived areas. The estimated levels of excess weight, adult physical activity and the rate of people killed and seriously injured on the roads are higher than the England average. Some of the areas where fracking has been proposed has a lower proportion of young people (aged under 16 and 16-24) and a higher proportion of older people (65-84) than the Lancashire and England averages (Ben Cave Associates Ltd., 2014b; Public Health England, 2015).

The vast majority of residents living near the two most recent potential fracking sites at PNR and Roseacre are white and over 66 percent identify themselves as English only. According to the 2011 Census data from the Office for National Statistics (on which the "Equality Decision-Making Analysis" at the LCC was based), people living in the immediate area are less likely to have their daily activities significantly limited by health or disability (7.6%) and more likely (50.9%) to be in very good health than other residents in the borough, county and England. The LCC analysis also states that impacts from Cuadrilla's project will not be significant beyond the area within a 1.5 km radius around each site. The final conclusion of the LCC document is that the project for exploratory drilling will not have a significant effect on the local communities, particularly in groups with protected characteristics. Additionally, according to the analysis, the impact that will be experienced will be universally felt and not disproportionately higher on people with protected characteristics than on people without (Lancashire County Council, 2015b).

It is unclear from the document if it was based on any social theory and if it presents any new analysis other than that presented in the planning officer's report. This current research project does not find that the conclusion of the LCC document is justified. First, the fact that the averages concerning health measures for the area are better than those for the region and England as a whole does not mean that the equality issues are less important or less significant in this area. Second, vulnerability is a social phenomenon, which means that in addition to health characteristics it is also influenced by social, psychological and economic factors. Feelings of vulnerability are also exacerbated by fear, anxiety and health concerns (present as well as future). Vulnerability is also produced by disempowerment and uncertainty (Willow, 2014; Willow et al., 2014), both of which featured prominently among the local residents during the course of this research. Feelings of vulnerability may influence people's health, thus significantly changing the conclusion presented in the LCC document. It is also not entirely clear from the document why, despite the different occupational patterns and sensory sensitivities between the different age groups and health conditions, it was concluded that the effects felt by the local residents would be universal. This current report includes data on the social and economic determinants of health from groups with protected characteristics as well as from those without.

3.1.1 Stress caused by engaging in the planning process

The health impact assessment conducted for the LCC recommended that health data should be collected before site preparation commenced, including self-reported and other measures of health status (Ben Cave Associates Ltd., 2014b). Although this would certainly be a valuable source of information, this research study has shown that in some instances even before site preparation began there were already significant effects on human health and social well-being experienced as a result of Cuadrilla's shale gas activities in Lancashire. These effects concern the cumulative and long-term (two to five years for some residents) impacts from prolonged stress and anxiety exacerbated through a range of social, economic and environmental health determinants.

In Lancashire, many individuals as well as several networks of concerned citizens decided to become involved in the planning process concerning Cuadrilla's applications for shale gas development in the area. Without exception, all members of the communities that were engaged in the planning process and grassroots activism reported significant levels of stress and anxiety. As one local resident who has been involved in RAFF put it:

> It's not something that you can do in a superficial way and it's bound to cause anxiety and be stressful. It's more of a challenge really and working with people who are a hugely supportive group and that takes a lot of stress away... Dealing with the police – I try to keep that, I don't want to be friends with them. I just don't want them to beat up my mates really – that's the intention... It's a challenge but some of these situations are very stressful...

> Mental health and well-being are definitely affected and it takes over lives. It becomes all-consuming. It dominates lives. It forces you to do things like the House of Lords [….] that was a biggie to actually do that and survive it and perform reasonably well. It's stressful particularly if you've got one of the pads across the road from you. It's balanced by the positives, being surrounded by and finding this wonderful community with values.

Some residents have also sought and, in some cases, paid for professional help to cope with the stress. Throughout this research, the most repeated statement in response to the question regarding the levels of stress experienced by the local residents was that their engagement in the issue 'has taken over their lives'. Just as the RAFF member above, many residents have pointed out that some of the stress they experienced as a result of their engagement was alleviated by finding and being part of a supportive grassroots community. This was most evident during the community campaigns and fund-raising events that are characterised by mutual friendliness, humour, help and support.

(Photo: Residents speak in front of County Hall in Preston, June 2015)

It must be appreciated just how much this issue and the people's engagement in the planning process have put the lives of many actively involved residents off the usual balance and routine, as one person living close to a potential fracking site aptly articulates:

It's the lack of balance in people's lives any more. You know, for people to have a decent quality of life, you've obviously got your home, your work, your family, you have those pillars... that is not the life that any of us are living. We're sole-track, totally going down this route and there is nothing else.

These feelings of stress and anxiety are mainly related to demands stemming from the residents' participation in the planning process and grassroots activism, both of which involve instances of public speaking, interactions with the police, media and political stakeholders as well as a wide array of other pressures; for example, the necessity to constantly struggle for money and to fund-raise in order to be able to afford professional consultants as well as the need to be able to read, understand and coordinate a response to documentation prepared by the gas company and the authorities within sometimes very tight deadlines has been found to be particularly stressful for the residents.

A resident from Singleton also stated that:

the biggest thing is the actual time commitment. It involves a huge time commitment and that on some people can have a huge impact so you've either got to say that I'm in this for the long haul or I can't actually cope with that amount of stress.

The main factor that is exacerbating the adverse impacts on the residents' health and well-being in relation to their involvement in the planning process is that despite their total commitment to it there is a sense that their concerns are not being addressed. This stems from the particularities of the planning process itself (i.e. its focus on 'material' considerations) but also from the declarations and actions of the government and the company described in the following sections of the report (see the sections on democracy and the relationship between the company and communities). In this context it is clear that it is unlikely at this point that any assurances from the government or the proposed regulation and mitigation measures will convince the residents to support shale gas development. This is because through their actions the government and gas company have undermined people's trust and confidence in their willingness and ability to listen to the residents' opinions and to address their environmental, social, economic and health concerns. Since these concerns extend beyond issues pertinent to residents living in the immediate surroundings of the fracking sites, it is logical to expect that the health and well-being impacts associated with increased levels of stress will not be limited to those residents but will encompass all residents in the regional and national networks of the affected communities.

Another important source of stress is the strain on family and other relationships caused by engagement in the issue. As one resident from Roseacre described it:

All small houseworks are on a back burner and that adds to the pressure. I'm quite resilient, just the odd days when I go into a panic mode. There was a couple of times when I got really stressed. One time I remember screaming at my son because somebody was coming to visit me and I haven't sorted out what I was doing and I lost it. I was probably a bit out of control at that time. Last night, [there was an] FFL meeting and [name] was making dinner cause I was doing something on a computer and I was really frustrated cause tea was already late and I knew that I was going to get picked up in ten minutes so I had ten minutes in which to eat my dinner and then I felt awful because I was leaving them to it to clean up and do everything, I felt guilty… [I had] guilt conscience that I'm neglecting my family.

Similarly, another local resident points out:

it has infiltrated people's lives to such a degree that they basically almost live and breathe fracking and that is not a good state of mind to be in because you might have family members who are or not so bothered and that creates a bonfire, fuel adds to the fire all the time. You come with a new bit of evidence or you met somebody else. You come back after a working day and there you are, you're talking about it again and living it again. It goes on and on like that. It's not good. You look for a bit of escapism where you switch off for a while, but there is always something that lurks in the background and raises its head again locally and other.

Two members of the FFL shared similar

experiences as well as pointed out that their involvement has also had financial consequences for them, all of which exacerbated their levels of stress:

- It's taken its toll. The stress, the worry, we have to travel a lot. We've been all around the country. We're fighting this industry that is like a monster and has so much money. They have these expensive PR companies who are paid to do this job and we're trying to juggle this all and compete with that when we have hardly any resources... We started off with nothing. We're printing staff off in college... At that time we wouldn't even ask for donations. That came much, much later. We were just funding it ourselves, paying for petrol to get to places just so we could raise awareness.

- It cost me tens of thousands of pounds and ultimately, a business that I was building... The stress, it completely takes over your life because I have a conscience and I can't walk away from this. There were a number of times when stress got to me and I was really down especially recently with the passing of my mother. There were a couple of times when the stress got to me, and I said that's it, I'm done, I'm not doing it anymore and people say to me you can't walk away from this, we need your knowledge and we need your skill set. To some effect, I'm being emotionally blackmailed by my own friends and colleagues to stay here, to stay amongst it [laughs]. I don't want to walk away. I just want to stop it for future generations. It has seriously damaged my family relationships whereas prior to getting involved in this, I'd have spent so much time with my children and my grandchildren. But this has just consumed my life... and everybody you'd talk to, it has consumed their lives for the last three years because we are so desperate to stop this.

It must be pointed out that there is clearly a general feeling that the residents are fighting an uphill battle with an industry that has much more resources than they could mount for the defence of their livelihoods and their local environments. This is seen as unfair and wrong because: (1) many of the local residents are either already or soon-to-be retired and were not expecting to be so busy and (2) the national government is perceived to be on the side of the industry and defending their interests, as these residents who live in the vicinity of two of the proposed fracking sites put it:

- There are people here who are stressed, distraught... there are people here who are having sleepless nights, cry over the very thought of it. It beggars belief that people have to feel that way. It's wrong… I had a high pressure job when I was with [name of the company] so I learned to cope and it reminds me of the pressure of the job I had then. The travelling, the worries that you have. The annoying thing is that I'm meant to be on a wind-down to retirement and I wasn't expecting to be doing all this work. My idea was to come home from work, do a few jobs, go for a walk or yoga.

- Life is full of stresses, it's the stress of providing for your family but then you have something like this which is the stresses of a force out there to oppress you, trying to literally deceive and take from you... It's a very stressful situation. It's a situation where it's putting a cloud over daily existence, over what the future holds. It is literally almost like a war sort of a footing because it's a force, it's this company that's so well in the government and it's so unbelievable really that they could have such a strong influence on the government through the old boy network and all the millionaires... They have such a corrupted effect on the government when you see people like Amber Rudd and other people from the Department of Energy and Climate Change who should be there, who should be about climate change, but they are ignoring their job titles and just act as puppets for Cameron and Osborne.

All of these social and economic factors are interrelated with and exacerbate the levels of stress and anxiety experienced by the local residents. They also have a clear impact on other health issues. There are a range of pre-existing physical and mental health conditions in the area, including but not limited to: cancer, chronic obstructive pulmonary disease, autism, asthma, diabetes, depression, various conditions of the gastrointestinal, endocrine and cardiovascular systems, impaired mobility and sleeplessness (Lancashire County Council, 2014b). This research study has found that at

least four people had to drop out of their involvement for health reasons, which testifies to the fact that the levels of stress caused by engagement are indeed significant as the following statement demonstrates. It was read out at a hearing on 10. March 2016 on behalf of a local couple in their seventies and eighties with significant health conditions:

More impacted than all of our ailments has been the significant levels of stress and anxiety the fracking situation has caused us. Should the planning be approved, we dread to think how this will affect us. We both genuinely feel that all the stress has had a detrimental effect on our health.

The ethos of involvement and contribution to this local struggle is very strong in the local communities in Lancashire, so much so that it has even influenced one person's decision to postpone a transplant surgery as she wanted to be present at an important planning meeting. The research has also found that there were instances when in the course of their involvement some members of the local communities with pre-existing conditions and disabilities were knowingly putting their health and well-being at risk because they saw the community's cause to be more important. This also highlights the commitment and determination of the local residents to stop shale gas development in Lancashire and in the whole of the UK. In fact, even these significant levels of stress and serious health conditions have not discouraged many of the local residents, as this quote from a member of REAF who lives in the vicinity of a fracking site demonstrates:

- It's stressful, not knowing whether your house is going to be worth anything for your kids that you've lived in all the time. What's gonna happen to them? … It was stressful at the beginning but I think I've made a lot of like-minded friends, which I probably wouldn't have met in that way. It was good. I'm missing it now. I'd like to get involved again. I'd like to lie down and let them [police] drag me away [laughs]

- Would you be prepared to do that?

- Oh yeah.

This local resident had to withdraw from engagement for some time but is now willing to return, even despite her serious medical condition. In fact, what is implied in the quote above is that her health condition could be a potential asset for grassroots mobilisation and for direct actions in the area. As a member of a vulnerable group, her determination and engagement in more radical forms of activism are able to make a powerful statement, to draw the media's attention to the issue and to inspire other people.

It may seem paradoxical that the local residents are opposing shale gas development because of the potential health impacts and stress that it could cause in the future but, on the other hand, they are willing to put their health at risk in the present. The difference is, however, that the potential health impacts caused by fracking would be a result of what the residents perceive as the government's effort to force shale gas development upon unwilling communities. Hence, for the local residents, allowing fracking amounts to loss of control over their own lives. When local residents decide to take an active part in a local struggle that they see as important, even if it means endangering their own health, they are reaffirming control over their lives which, apart from a strategic advantage, is a deeply empowering experience.

Here is how a resident from the PNR articulates the relationship between this loss of control and stress:

- If you've got a weak spot, it always goes to that one. People's immune systems seem to become compromised because they've been living in a state of heightened stress every day and whilst the health impact assessment [Ben Cave Associates Ltd., 2014b] acknowledged anxiety and stress, it was almost as if that's the only thing... that's happening in relation to this fracking application. And that's not really the full picture because it's how that stress and anxiety which is sustained over a two-year period impacts on people's health and, let's face it, it's not even come yet and we've already had two years feeling like we're in the middle of this awful situation and I think whenever people have a situation when they have no control whatsoever over the outcome, it's really bad for you. I used to do stress

management lectures and one of the first things that I said was to try and claw back a little bit of personal power so that you feel that somebody else is not making all your choices, all your decisions and whatever, which is quite laughable in relation to this really... I recognise all the things that are going on and I think there is an awful sense of people feeling vulnerable and exposed...

These feelings of being trapped and losing control over one's life also stem from the economic uncertainties caused by shale gas developments, which further contributes to the stress that is experienced by the local residents. As another member of the PNR group points out:

It's definitely been a very stressful experience, not knowing what's going to happen, worrying that you work all your life, put the majority of your investments in your property. Our property is probably worth nothing at the moment because nobody wants to buy properties in that area. Even if we wanted to move, we would not [be able to sell our property] so from a financial point of view, that means that we're a lot worse off until it's all resolved. If it goes ahead, then we're stuck in a house that we can't sell somewhere where we no longer want to be but we can't do anything about it.

Although involvement in close-knit grassroots and informal groups can often alleviate some stress, it may also exacerbate the health impacts because people perceive that they are connected to other members of a group more than just as acquaintances and worry about others, as this local resident put it:

It's difficult because I don't sleep much anyway. I do have insomnia but it is stressful... seeing other people stressed as well. [Names] were selling their house [which they had to sell at a reduced price because of the potential of fracking in the area]. It affected both of them and of course it has a knock-on effect because they're your friends and you worry because there is nothing you can do about it... For example [name] at the moment is having a problem with various people about copyright and organising, buying stock... and I feel so sorry for her because she's working so hard... Generally, I don't get stressed by it but I get upset by seeing other people and how it's affected them. I get angry more than anything else. Mind you, I don't think that anger is that good for you. [Name] is very cross about something at the moment. He works so hard for RAFF and FFL so seeing him so upset and angry about it, I think it's awful really.

These feelings of anger and helplessness are also often reported to be an intrinsic part of the collective experience of the planning process. This means that the local residents may experience very strong emotions of sadness or, conversely, euphoria, though the latter is not as common as the former since it is feared that the decision regarding allowing fracking in the area is a foregone conclusion if it is going to be made by the government. Again, taking the final decision out of the hands of the local authority is seen as a denial of democracy and human rights, which provokes very strong emotional reactions, as this local resident confirms:

Apart from having perhaps more highs and lows of emotion than I would normally have, I find that I do get really angry at things that are unjust… Even when I went to the Blackpool hearings…, I was listening to some of the people who were talking... I was listening to one particular person and toward the end of her five minutes, she actually broke down and she sobbed. I started to cry… I had somebody sitting here last night and our eyes filled up with tears and this is an elderly lady… [She asked] 'What are we going to do?' We'll just keep on doing exactly what we are doing. You can't get upset. It doesn't do you any good and doesn't do me any good because I will join in. Just know that if and when... Greg Clark does call this in, then it's no longer about fracking, it's now going to be about democracy and it's going to be about human rights.

There are some very strong negative feelings, particularly regarding Cuadrilla's CEO, and every encounter with him seems to be another source of stress for the local residents.

Minor and potentially stress-triggered health issues, such as eczemas or headaches, as well as problems with sleep were also reported by the residents in the more general context of strains connected with their engagement in the planning process as well:

I'm tired and I get a lot more headaches because I'm on a computer a lot more and have to write a lot more. My biggest problem is sleeping, lack of sleep because what I do is work late, wake up in the early hours, think of something, I need to do, put it in my mobile, then I look at Facebook or my mailbox. That's probably why I'm tired. I have been up at 4 am writing reports and sending stuff in the middle of the night because I thought that I needed to have that done. I have not been doing the exercise that I should be doing. I have type 2 diabetes and overweight so I'm not looking after myself properly. I should be eating more carefully but because I'm rushing around, anxious, [I don't]. I haven't had to go to the doctors yet but there have been people here who have.

3.1.2 Health effects of community disruption

Some local professionals fear that fracking could aggravate mental health problems in the area because of such community stressors as noise, traffic or crime. This pertains to a situation in which Fylde, for example, is already experiencing significant rates of self-harm-related problems and, according to the LCC, the current economic conditions are also affecting the need for mental health services (Ben Cave Associates Ltd., 2014b).

The residents also point out that access to health care in the area is already poor. Therefore, if shale gas development were allowed to proceed to the production phase, their access to health care services might be negatively impacted due to increased demand (Ben Cave Associates Ltd., 2014b).

Community stress can also arise from psychosocial conditions, such as a breakdown in social relationships or in crime. Research in the US and Australia reported that shale gas activities in the local communities can be associated with many outcomes, such as collective trauma and depression (Perry, 2012b). The introduction of an intensive extractive industry can divide communities and undermine their social fabric (see the section on community impacts), thus leading to further health impacts and exacerbating the effects of other hazards.

In Lancashire, the sense of community breakdown that has given rise to health impacts was largely caused by the falling out between neighbours who had different opinions about shale gas development. Also, significant in this regard has been the change in relationships between the residents and the local families that provided land for the fracking sites. The situation was a cause of stress, anxiety, anger, depression and, on some occasions, even substance use. In rural Lancashire, the shale gas development has spurred conflicts between people who used to be friends and good neighbours but now felt they had to install cameras and involve the police to arbitrate. The families that had allowed the company on their land, on the other hand, could feel that they were being stigmatised and labelled as bad or deviant (more about this aspect of shale gas development in the section on community impacts).

The health and well-being effects associated with anxiety and grief caused by community breakdown extend beyond the immediate area to tourists who come to visit as well as the families and friends of the local residents. As one resident from East Lancashire pointed out on 10. March 2016 at the hearing in Blackpool, areas potentially affected by fracking are not atomised but important to the self-identification of the wider communities. If something fractures the local communities, it also influences the sense of self for many non-local people.

3.1.3 'Mental anguish' caused by the attitude of the company and the authorities

This study discovered that much of the stress experienced by the members of the local communities was caused by a profound sense of moral outrage at the activities of the gas company as well as at the actions of the local authorities and the government. This outrage has also led to depression, annoyance and feelings of disenfranchisement.

From the very early days of Cuadrilla's presence in Lancashire, the residents felt that the company was not being truthful about the details of the fracking process and was not

responsive to the questions they were raising, as this resident and subsequently a member of RAFF and FFL admits:

> In the early days, ... I went to a meeting by Cuadrilla that they had and I came away with many many more questions because they weren't telling the truth. They were dodging my questions; they weren't answering them directly, lying in some cases and so that's what spurred me on because they were this company who landed in my community and they weren't being truthful. I knew that from the beginning… A lot of my questions were about the health impacts and they said there weren't any. And chemical use, I said, what chemicals are you planning to use here? Because I knew that was linked to health impacts of the people in the US. And they said: 'we're not going to use any chemicals. We're gonna use, it's nothing nasty. It's what you find in contact lenses'. He was trying to say that it was things that you've got in your kitchen cupboard so he was trying to normalise it. That was all 'very benign, it's nothing'.

This fragment shows that in an era of readily accessible and instant information technology, the local residents were and are not easily convinced by risk-refuting information regarding natural resource development. In fact, feelings that the company was downplaying and knowingly dismissing the potentially adverse impacts of shale gas development in Lancashire have been very widespread in the local communities and have been one of the major factors behind the 'mental anguish' and anxiety that may have a negative impact on people's health and well-being:

> They [people living next to fracking sites] all felt their health become worse because of the mental anguish caused by the propaganda first and foremost by Cuadrilla and the government and the reality that they know it but they don't acknowledge it.

The ES does not acknowledge that there may be any significant health impacts on people living and working next to or at the fracking sites. However, as the LCC's health impact assessment points out, in reaching this conclusion consideration was not given, for example, to unplanned emergency events (Ben Cave Associates Ltd., 2014c). Other reports, such as the one prepared by The Royal Society and The Royal Academy of Engineering and another by Public Health England, are felt to have largely ignored the risks stemming from casing erosion and failure or accidental wastewater spillages, i.e. dangers that are inherent to development whatever the regulation might be. Critics from the medical profession have also pointed out that such reports 'focus on mostly hypothetical regulatory and engineering solutions [and therefore] may mistake best practices for actual practices' (Law, Hays, Shonkoff, & Finkel, 2014, p. g2728). Hence providing more information affirming rather than demonstrating a lack of risk to health is currently not likely to reduce community fears about shale gas development in the area.

Furthermore, the various inconsistencies and gaps in the information provided by the company at different stages of the planning process were also a cause of stress, e.g. in some of the original application documents Cuadrilla had used a map of the area that failed to take account of some of the newest residences that also happened to be located in the immediate vicinity of the proposed site. They reproduced the map in an unchanged form in some of the later documents, despite repeated requests from the residents for this to be corrected. Members of the local community felt that this attitude was unprofessional and showed a lack of commitment, care and real interest in the area and its inhabitants on the part of Cuadrilla.

Stress has also often been the response of the residents in relation to feelings of uncertainty about whether Cuadrilla would be able to plan for and appropriately manage the different aspects of shale gas projects in the area. In particular, doubts emerged regarding the control and disposal of wastewater flowback at the PNR and Roseacre sites. As the company was not proposing to treat the flowback water on site, it would need to be transported to and disposed of at a specialist treatment facility. Cuadrilla proposed two such facilities but did not disclose their names or precise localities. After subsequent analyses, the residents became aware that the estimated volume of flowback water from one site would be large

and would take up approximately 65 percent of the treatment capacity of the proposed facilities (Watson, 2014). Hence it became questionable in the eyes of the residents whether the practice that the company had proposed would be manageable, and fears arose that the company might want to dispose of the water in other, non-legitimate ways. These actions on behalf of the company have led to levels of anxiety that may be difficult to manage. In fact, one local resident from Roseacre clearly stated this fact in his representation at the hearing in Blackpool on 10. March 2016: 'what they [the company] can't mitigate is the fear and anxiety of those living close to the proposed site'.

In comparison to the company, the local authorities and the LCC in particular have taken a more comprehensive approach to health impact assessment. The director of public health made sixty-one recommendations to the proposed projects at PNR and Roseacre and at the session of the Development Control Committee in June 2015, he put it quite obviously that:

> On balance, I recommend that the Committee considers that no development shall commence until a scheme and programme for establishing a baseline and ongoing monitoring of health and well-being outcomes of the local residents as well as the workers on site have been submitted to the county planning authority and approved in writing by the director of public health.

The residents interpreted this statement as confirmation that the proposed project could pose significant risks to human health. However, the planning process with its focus on 'material' considerations did not seem to provide room for making health impacts central to the planning decision despite the fact that they were clearly key reasons why the communities were opposing the development. The feelings of powerlessness that resulted from this situation explain why there has been a profound sense of disenfranchisement that has, in some cases, led to depression and could potentially further exacerbate people's pre-existing conditions, as this representation read out to the Development Control Committee by a friend of the person who wrote it clearly demonstrates:

> I live in [local village]. We brought our children here to live in the country, to experience dark nights, bright days, to go to school, to play in safe surroundings and to grow up strong and healthy – everything that the planning policies are supposed to safeguard. I value their health even more than most mothers because of my struggle with cancer. My illness owes nothing to fracking but you really know the value of health and you care deeply about protecting it. I know you cannot make judgements about planning based on how I feel or what I would like but I also know that my family are receptors. There are nearly 200 receptors within a thousand meters of the site – 20 percent are children, some are babies. If this application is permitted, we will feel the impact of the fracking site and live with it all day and all night – possibly all my days and all my nights [her voice breaks]. I know you have a duty to consider the adverse impacts upon us, nuisance, … tankers full of fracking fluid, the noise day and night, the dust, the dangerous emissions, the traffic so dangerous on our rural roads and the relentless lighting. I know that you must guard the character of the landscape and look at amenity... I am not stupid. Industry must go where industry must go. But Bowland shale does not sit just below the site at Roseacre Wood. There should be some give and take. Some recognition that planning matters. Why try to mitigate the unmitigatable? Nowhere in the field can be less suitable, bring greater impact to the people who live close by or fly in the face of every planning policy that I've ever looked at.
>
> County Councillors, I know I'm not everything but I'm not nothing either. Nor are my children, my family, my friends, my neighbour or my community. Nor are the interests of all who visit and value our part of the Fylde. And even if I can see the policies such as the DM2 have not been satisfied, I know you can… Using words from the NPPF, this is land where this development would be inappropriate and therefore should be refused.

Although the residents were allowed to voice their health concerns before the LCC and, subsequently, the Planning Inspector, they were very much aware that those issues could

not be the main basis of the planning decision. However, this situation clearly put the county councillors in a difficult position in that two of their responsibilities came into conflict with each other: they were answerable to the people whom they represented and, therefore, should have responded to their concerns and, at the same time, they had to take the decision whether to allow shale gas exploration according to the planning policies. In an interview, one county councillor described this as follows:

> It's difficult... because odds are stacked against the planning committee at the end of the day because the government makes the decisions and the government is totally for fracking. And the government has put us in a very difficult situation. Having said that, we were able to deal with the noise levels on the planning basis and also light pollution so these were two issues that we could deal with but with regard to health, nobody could tell me that it was going to be safe to the people that I represent. Other councillors are also very unhappy about the situation because public health is obviously crucial to the people they represent. It should be the first issue that we look at rather than something that we disregard. The government has decided that in the interest of the UK, this is more important even though it will have detrimental effects to part of the population. And the government always gets things wrong on the basis that now we are being told that they made a dash for diesel a few years ago [and] now they're saying that diesel is killing 50,000 a year. Has the government made those calculations with regard to fracking? And have they decided that that is the price worth paying?

Some county councillors recognise the narrow parameters of the planning process but the government's ability to override local decisions contributes to the residents' sense of helplessness. Anxiety over the health and well-being impacts of shale gas development in Lancashire, fuelled by a widespread sense of annoyance, disenfranchisement and powerlessness caused by the attitudes of the company and the government as well as the limitations of the planning process, are therefore already having significant and widespread impacts on the residents' physical and mental health and well-being.

3.2 Death in the community

Engagement in social campaigns often has two sorts of very different impacts that may be difficult to manage. One is positive in that individuals in grassroots groups often find the support and camaraderie they need but, on the other hand, there are also the stresses of being involved in a contentious issue where one feels that one is against a very powerful opponent. This situation may be particularly difficult for people dealing with mental health issues such as depression. The 'highs' of engagement can be very helpful in tackling one's illness but the 'lows' can be very hard indeed.

In 2015, George Bender, a farmer and anti-mining campaigner in Queensland, Australia who opposed the coal seam gas industry for many years, committed suicide. His relatives claimed that it was due to the bullying he experienced from the gas companies over the years and from the lack of interest and support from the authorities (Robertson, 2015).

Death is perhaps the most severe impact of any development and not only has a direct effect on the individual's family but also consequences at the community level. In close-knit, grassroots groups such as those engaged in the fracking planning process in Lancashire, this loss is also experienced collectively and influences the people's determination and commitment to the cause.

Throughout the local residents' engagement in the shale gas issue, many of them have lost close members of family or friends. Feelings of grief, bereavement, shock and stress have impacted their health and well-being, but the consequences were to some extent mitigated by the support of the local group which seems to currently be forming a coherent community.

The sense of collective and personal loss that many community members experienced after the unexpected death of the BBC Radio Lancashire journalist Steve Becker who was active in covering their story, however, was soon turned into positive action. A fundraiser was set up and the money raised was donated to a charity of his choice. One of the PNR group members describes the moment she learnt

Box 3.2 Karen Merritt

In the course of this research, the local community lost one of its valuable members who took her life in 2016. The residents believe that this was partly due to the prospect of fracking in the area.

Karen Merritt was a member of the Lancashire Nanas as well as Amnesty International and the Green Party. According to those who knew her best, throughout her engagement she became more and more empowered. It is in the group where she felt truly safe, even during direct actions. She used to say that it was only with the Nanas that she felt she was truly being herself. Karen is remembered as an incredibly caring person, dedicated to easing the suffering of others, furthering justice and democracy.

In a eulogy, another Nana wrote:

The Karen we knew, earned the trust and respect of colleagues, friends, fellow volunteers, activists and strangers – always relied on for the truth and she spoke it clearly. But true to her own gentility, understanding and kindness – she tempered her straight-talking with good manners, courtesy, politeness and an acute awareness of our feelings. She understood the reality of life's challenges and sought always, to ease the burden of others…

I think everyone in this room wishes they could have given more, been more and seen more… of what it was that Karen needed in return. BUT she would have taken our wishes, illuminated them with her gentle truth and made clear that they are not ours to wish. And then – in her ever-so-determined way, Karen would have encouraged us to instead wish – that we give more, be more and see more of what we each need ourselves… taking gentle care with all that is precious.

In the local anti-fracking communities, Karen's story serves as a powerful testimony of how disempowering the activities of the gas industry may be.

(Photo: Lancashire Nanas with Karen in June 2015)

about his death as follows:

(Photo: Steve Becker at work, June 2015)

> On the Wednesday we turned up and Steve wasn't there and it was the first time in two years he hasn't been where he said he would be. So the hearing started and then midway through, [name] came across and she just said to me: 'Steve has died'... He can't have. He's coming here to interview me and that's how stupid I sounded because I was like he can't have. It's a dreadful mistake. You know what was really really interesting for me – this has been my total focus for two years, seven days a week but that afternoon, which was probably the most critical afternoon the whole hearing with Cuadrilla's evidence, I sat there and I faced Mr Egan and their QC and I listened but a bit of me was stepping back from it and thinking that [he] is not gonna be there to see this outcome. I was absolutely horrified and I thought it kind of put things in perspective for me that life isn't very fair and sometimes bad things happen to good people. So I was just shocked, bewildered, there was a lot of tears from the group. Within hours we had a fundraiser going on on the side and I think that says it all about the nature of the anti-fracking community – a lot of people who care about individuals, the environment and what we're going to leave for the future. But also about even people like Steve who wasn't a member of our actual community but who we valued and respected.

This fragment shows that the health and well-being impacts experienced as a result of death are being mitigated through action-oriented collective support of the members of the local anti-fracking groups.

3.3 Fear of environmental impacts on health

This study has found that there is a very strong sense of anticipatory anxiety related to the environmental determinants of health in the local communities in Lancashire that could be affected by fracking. This is in large part based on the findings of peer-reviewed publications concerning the effects of fracking in the US and Australia. Thanks to this, people in the UK are better informed than people in the United States or Australia were at similar stages of the development.

Assessments about the potential risks to health and the environment differ but, in general, the community understanding of risk seems to be in line with the AEA analysis for the EU. In its summary of preliminary risk assessment for hydrocarbon operations involving fracking in Europe, the overall rating of risk across all phases of fracking at one site is moderate to high in all but two categories (visual impact – low to moderate, and seismicity – low). The cumulative risks, however, are high in all but those two categories. The other categories include: ground and surface water contamination, water resources, release to air, land take, risks to biodiversity, noise impacts and traffic (AEA, 2012).

3.3.1 Water and air pollution

Water and air pollution resulting from shale gas activities is one of the major fears in relation to potential social well-being and health impacts (Fischetti, 2013). Water pollution can occur via a number of pathways, including poor casing quality and compromised integrity of gas wells (Ingraffea, Wells, Santoro, & Shonkoff, 2014), leaks through fractured rock as well as leakages

and spillages during wastewater transport and disposal (Olmstead, Muehlenbachs, Shih, Chu, & Krupnick, 2013). The fracturing fluids used in the process are known to contain chemicals, such as methanol, ethylene glycol, naphthalene, toluene, ethyl benzene, formaldehyde and sulphuric acid, some of which are carcinogenic and toxic. The vast majority of known fracking chemicals can negatively impact the sensory organs, the respiratory and gastrointestinal system as well as the liver. Over half of the chemicals can negatively affect the nervous system. Uncertainty about the chemical make-up of the fracturing fluids persists because of the limited disclosure by the fracking companies (Shonkoff, Hays, & Finkel, 2014), which creates distrust towards the shale gas industry and further worsens popular perceptions of the potential risks.

During the planning inquiry in Blackpool, health and engineering professionals pointed out that the risks from potentially hazardous pollutants may be low but only if stringent safety measures and best practice guidance exist and are implemented. Simultaneously, however, they raised doubts about whether this was already the case, especially regarding the issue of wastewater treatment. Hence they suggested that Cuadrilla's assessment of risk in this area has been underrated and may need to be revised (McCoy, 2016; Watson, 2014). Studies that found evidence for contamination of groundwater wells with methane and fracking chemicals in such places as Pavilion, Wyoming and Dimmock, Pennsylvania have been contested by the pro-fracking side but are widely recognised as legitimate by many local residents in Lancashire who live in the vicinity of the actual and potential fracking sites. The letters and representations of the local residents to the LCC draw on a number of scientific studies and journals to substantiate their claims about the potentially adverse health impacts, such as the public health review of fracking for the Department of Health of New York State as well as various articles from The Lancet, British Medical Journal and the Medical Journal of America.

Although it still has some limitations, there is a growing body of epidemiological literature that has reported the health effects of fracking which are consistent with known health and well-being impacts associated with petroleum hydrocarbon exposure, such as: irritation to the respiratory system, throat irritation, impaired

(Photo: Preston, June 2015)

lung function, adverse response from the nervous system ranging from dizziness to a loss of consciousness as well as an increase in birth prevalence of neural tube defects in cases of maternal exposure to benzene (Adgate, Goldstein, & McKenzie, 2014; McKenzie, Witter, Newman, & Adgate, 2012).

Some research studies suggest that shale gas developments lead to the release of air pollutants that are associated with increased risk of mortality and morbidity. The emissions take place as part of many shale gas activities: from drilling and processing to the transportation of sand and chemicals (Shonkoff et al., 2014). Several studies have suggested that shale gas operations emit such hazardous air pollutants as: benzene, toluene, ethylbenzene, xylene, formaldehyde, hydrogen sulphide, acrylo nitrite, methylene chloride, sulphuric oxide, nitrogen oxides, volatile organic compounds (VOCs), diesel PM, radon gas and methane, among others (Colborn, Schultz, Herrick, & Kwiatkowski, 2014; Pétron et al., 2012; Shonkoff et al., 2014). A group of researchers estimated that damages due to health effects from air emissions associated with the shale gas industry in Pennsylvania would cost $7.2-32 million in 2011 (Litovitz, Curtright, Abramzon, Burger, & Samaras, 2013). Even with comprehensive baseline studies, however, the full health impacts from potential air and water pollution will probably never be known because of non-disclosure agreements signed between the affected individuals and the fracking companies (Adgate et al., 2014).

Air pollution can have significant and adverse physical effects, particularly for people with respiratory or cardiovascular conditions, and the residents' anxiety regarding the pollution can cause them to stay indoors, thus reducing their levels of physical activity and social interaction. This, in turn, can affect people's mental health (Ben Cave Associates Ltd., 2014b).

It is important to understand the health effects of air and water pollution and their interrelated impacts on the social and economic well-being of local community members, as this family business owner who lives close to the potential fracking site aptly articulates in his representation addressing the Development Control Committee at the LCC in June 2015:

> The years have not been easy, especially with the last recession but we have battled on when many have fallen by the wayside. The biggest threat to our existence is the proposal to drill and frack in our locality including under our homes. This application, if allowed to proceed, will without doubt destroy our business, way of life along with four full-time jobs and our home. Why? Because our environment will become too contaminated to carry on. Our [business] caters mainly for home owners, families who usually visit with their children as part of a day out. And there is no way they will continue to visit us in an area where ill health and painful life-shortening diseases would be triggered. The serious health effects associated with fracking are well-documented and you have been personally informed of these by the medical professionals… You must listen and accept their good sense rather than the council officials [planning officers] who have been influenced by a government with industry connections. You must refuse this application on health and environmental grounds which you and the industry know cannot be mitigated and not just on noise and landscape which, you would recall, caused the applicants to giggle

and smirk when they asked for a deferment back in January. You should have [shows a piece of paper] a simple illustration which demonstrates just how vulnerable my family, neighbouring residents and business will be to the toxic contaminants which will be released into the environment both knowingly and accidentally. The drill at the frack site is approximately [...] meters away on high ground in front of the properties on [name of the place] and with high ground behind us…, we are in a valley. This means that all leakages, spillages and overflows of toxic fluids will inevitably flow downhill in the groundwater onto and under our properties as well as what will migrate along up the existing and frack-induced geological faults. And it is not just toxic liquids we live in fear of; fumes released into the air with methane gas during flaring will contain radioactive particles and toxic materials, all of which are triggers for ill health and painful, life-shortening diseases such as respiratory diseases, cancer and birth abnormalities. Any person downwind will have no choice but to breathe these toxic substances in. And when there is no wind, at times of high atmospheric pressure, these fumes will drift downhill and form a toxic smog over, around and in our homes.

As this fragment demonstrates, the potential health impacts from air and water pollution are not the sole cause of the anxiety. They may also have very real impacts on local businesses, which also exacerbates the fear of fracking, stress and feelings of being trapped in a place that has a clear emotional value to the residents and forms the basis of their economic livelihoods but which could subsequently pose threats to their health.

The local resident above is also echoing an opinion that is widespread within the local community that the health impacts ought to be central to assessing whether fracking should be allowed to go ahead. Importantly, as his representation also shows, the local residents understand the health impacts broadly and treat them as inherently interconnected with other kinds of impacts (including social and economic impacts) that do and do not officially form 'material' consideration for the planning authorities. The local residents' perception is that the gas company is cynically taking advantage of the fact that these impacts cannot be brought to bear on the planning decision, which further widens the power gap between the local residents and the industry. The local resident above also pointed to the widespread perception that there are meaningful connections between the British government and the gas industry. Shale gas companies are allegedly exerting undue influence on political decision-makers. This conviction undermines the residents' trust in the national government and the regulatory regime. Hence health impact reviews that conclude that the potential health risks from exposure to chemical and radiological pollutants will be low 'if the operations are properly run and regulated' (Kibble et al., 2014, p. 46) are treated with inherent suspicion, dismissed or regarded as another instance of the government facilitating the shale gas industry's endeavours.

3.3.2 Noise and light

The noise related to shale gas developments may originate from a number of sources, such as: the construction of the drilling site, drilling and hydraulic fracturing processes, the operation of diesel generators and compressors at the site, and vehicle (particularly HGVs) movements to and from the site. These activities create disturbance from noise that is continuous and takes place 24 hours a day, seven days a week. Noise sensitivity varies between individuals and depends on personal judgement as well as on auditory acuity. People experiencing increased levels of noise for prolonged periods of time might report annoyance and sleep disruption (Shepherd, Welch, Dirks, & Mathews, 2010). This, in turn, can increase stress, anxiety and depression and give rise to other health problems, as a local mental health professional pointed out during the Public Inquiry in Blackpool.

Noise was one of the most frequently mentioned potentially significant adverse impacts of fracking in Lancashire and has caused a considerable amount of anxiety. The problem was the night-time noise which Cuadrilla proposed during the appeal process as 42 decibels (as opposed to 39 dB as set out in the planning conditions) (Herbet Smith

Freehills, 2015), which is significantly higher than the current levels at the predominantly quiet and rural locations and was perceived to add substantially to the current noise in the vicinity of those proposed fracking sites that were already experiencing increased noise levels from the nearby British Aerospace facility and the nearby motorway, M55. As one local resident pointed out:

> one of the worst health impacts is particularly this kind of noise. In planning, they don't take low frequency noise into consideration and WHO said that this kind of noise can cause all sorts of physical and mental damage. [It] can cause depression, heart disorders because you are not aware of this noise. At Balcombe, Cuadrilla's planning conditions set the noise level to 43 decibels but they exceeded it. They didn't admit to it until local people complained and EA [Environment Agency] came and measured themselves. But if you increase noise level by one decibel, it is an equivalent of increasing it ten times. Here they said 42 decibels but experts agreed that it was too high because at PNR you still have all the other noise – the aircraft, British airspaces. It also has the power to disrupt your sleep... The noise invades you not only though your ears but entire body. They said in the planning condition that this is the noise level but there is no way that anybody could force them to stick to that all the time and that would be left as a burden to the community.

More importantly, this local resident also highlighted the social factor that was exacerbating the fear of the adverse health impacts through noise, which was the fact that he did not believe that the company would abide by the noise limits set out in the planning conditions. He also felt that this was creating an unfair burden imposed on the local community as it would be left to them to monitor the noise levels and to ensure that potential breaches were being reported and dealt with.

This research study found that the residents have been worried that noise from the fracking sites would cause sleep disturbance and sleeplessness, thus increasing feelings of fatigue during the day and negatively impacting their day-time well-being. Similar effects were reported in Colorado, where residents additionally experienced cognition and mood changes, and stress was linked to poor school performance (Witter in Kriesky, n.d.).

Similar effects are expected to arise from the increased levels of light due to illumination of the rig. Local residents in Singleton and Anna's Road who experienced this effect from the exploratory sites recall that the rig was 'lit up like a cathedral on a desert… the lighting was tremendous'. Residents also reported that the light was particularly intrusive at night when it entered people's bedrooms and disrupted their sleeping patterns.

3.3.3 Health effects from the area's change of character

This research has confirmed that many of the local residents had made a conscious decision to move to a rural area for health reasons and because they wanted to spend their days on retirement in a place with cleaner air and better living conditions in order to improve their well-being and life expectancy. Fylde is also known as a popular retirement resort.

The estimated life expectancy varies among the different wards with fracking sites in Lancashire but is generally in line with or above the England national average. Environmental factors such as the rural and tranquil character of the area influence individual and community well-being. They also determine the components of collective and personal resilience (National Mental Health Development Unit, n.d.). A development which introduces an industrial process into a rural and tranquil area can therefore also indirectly affect the residents' health and well-being, especially in those with pre-existing conditions, as this local resident with a serious chronic condition who lives in the immediate vicinity of the proposed site on PNR puts it: 'I will smell it, hear it, see it. How can you say that this is not significant as an impact, I don't know'.

From a social point of view, the company's case in Lancashire is made worse by the fact that it targets areas in a region (the Fylde coast most generally) that is popularly known for its clean and pristine environment and hence attracts many potential retirees and people struggling with health issues. This specific characteristic of

the local population makes it vulnerable and could potentially exacerbate the health impacts of shale gas activities in the area. Second, the stress and feelings of social injustice stemming from the perception that the company is targeting a vulnerable social group only exacerbate those impacts.

3.3.4 Climate change impacts

Fracking operations produce greenhouse gas emissions and lead to the extraction and, as a consequence, burning of more fossil fuels, which contributes to climate change. According to certain estimates, emissions from two exploratory sites in the Fylde may amount to 5–9 percent of the region's total emission budget that is consistent with the Paris Agreement (K. Anderson, 2016). Furthermore, analyses of the greenhouse gas footprint of methane over the crucial 20-year period showed that it is larger than that of coal and oil, mainly due to fugitive methane emissions (Howarth, 2014; Howarth et al., 2012; Howarth, Santoro, & Ingraffea, 2011).

Box 3.3

In its Fifth Assessment Report, the Intergovernmental Panel on Climate Change presented a number of health impacts stemming from climate change, such as:

i) Risk of death, injury, ill-health, or disrupted livelihoods in low-lying coastal zones and small island developing states and other small islands, due to storm surges, coastal flooding, and sea level rise.

ii) Risk of severe ill-health and disrupted livelihoods for large urban populations due to inland flooding in some regions.

iii) Systemic risks due to extreme weather events leading to breakdown of infrastructure networks and critical services such as electricity, water supply, and health and emergency services.

iv) Risk of mortality and morbidity during periods of extreme heat, particularly for vulnerable urban populations and those working outdoors in urban or rural areas.

v) Risk of food insecurity and the breakdown of food systems linked to warming, drought, flooding, and precipitation variability and extremes, particularly for poorer populations in urban and rural settings. (Intergovernmental Panel on Climate Change, 2014, p. 13)

These health and well-being effects are not limited to populations living in the immediate surroundings of the fracking sites but extend throughout world. All scenarios derived from realistic anticipated emissions trajectories will lead to worsening health impacts (McCoy, 2016).

3.4 Occupational health

According to data from the Health and Safety Executive (HSE), the rates for work-related ill health and non-fatal injuries among workers in the North West region over the periods between 2011 and 2015 were in line with Great Britain's average, and the overall trend over the last 15 years has been declining (Health and Safety Executive, 2015b). There is a strong possibility, however, that shale gas workers may experience negative health effects due to a number of factors, such as:

- the presence of hydrogen sulphide (H_2S), which is an explosion risk and an acute toxicity hazard;
- silica sand used in the fracturing process can contain respirable silica that can cause silicosis and lung cancer as well as other pulmonary, kidney and autoimmune diseases;
- exposure to petroleum hydrocarbons and aliphatic compounds during well development and production has been associated with leukaemia, lymphoma, anaemia, blood disorders and immunological effects;
- exposure to diesel exhaust from generators and vehicles has been associated with respiratory and cardiovascular disease;
- indirect impacts on health and well-being including from increased rates of sexually transmitted diseases and stress stemming from strained local infrastructures and tensions with local communities (Bate, 2016).

There are also many accounts of injuries and deaths from blasts and other accidents at fracking sites in the United States (Rubright, 2014).

The HSE, which is the health and safety regulator in Great Britain, is responsible for ensuring that the well operator complies with the relevant health and safety regulations to prevent workers and others from suffering injury or ill health (Health and Safety Executive, 2015a). According to information obtained from an HSE official at a public information day in Knutsford, Cheshire, the agency has a statutory requirement of at least one visit at the exploratory phase of shale gas operations. Work at the site is monitored through weekly operations reports submitted to the agency by the operator as well as via a well examination scheme. The well operator is required to appoint an 'independent well examiner' who:

> must be an independent competent person. They can be from the same company as the operator, but must be separate from the immediate line management chain of the well operations being examined. To date, for onshore shale wells the independent examiner role has been undertaken by organisations from outside of the operator's company. Where the independent well examiner is part of the same company as the operator, HSE checks that the operator has suitable management separation arrangements in place (Health and Safety Executive, 2015a, p. 7).

According to the information from public information day, the HSE has 10–11 officers who are currently responsible for monitoring or inspections of shale gas operations for the whole of the UK. It is believed that this constitutes sufficient resources for the moment but the agency is keeping this under review.

It was not possible, in the course of this research to date, to verify this information with the opinions of shale gas workers in the UK regarding the potential health and well-being impacts. Unite, which is Britain's largest trade union, is committed to actively opposing fracking and is using its influence to prevent fracking operations (Unite, 2014).

Proper insurance cover for rig workers as well as other employees in the area may be a problem since, as one local employer pointed out:

> One thing that I found out is that no insurance company will insure for anything other than seismic activity... In the future, when health issues and evidence comes forward [somebody could say] yes, I did work in that area when fracking took place... And in the end after a long long fight, it could take decades, and it's actually admitted that it was because of fracking, there is no insurance cover... So that in itself creates a stress.

4

COMMUNITY IMPACTS

Since the 1970s, researchers have been exploring the so-called 'boomtown' phenomenon (England & Albrecht, 1984; J. S. Gilmore, 1976). The process describes the social impacts of rapid development and industrialisation of rural areas that are usually caused by the discovery and extraction of natural resources (the 'boom'). These are sometimes followed by a rapid decline ('bust'). Although there are a number of empirical complexities and novel risks that make shale gas exploration and extraction different in some respects from those earlier developments, the boomtown phenomenon is generally conceived as a useful starting point, especially for examining the social disruption impacts (Brasier et al., 2011; New York State Department of Health, 2014; Smith Rolston, 2013; Willow & Wylie, 2014).

The social disruption effects documented in the boomtown literature are, for example:

- rapid population growth connected with the significant number of in-migrant workers coming to the area;
- social conflicts and tensions;
- increased demand for housing and cost of living;
- (perceptions of) environmental degradation;
- widening of social inequalities;
- increased crime and substance abuse;
- increased stress on local organisations and community services;
- increased traffic and road destruction.

Box 4.1 Farmers

In the popular perception, many farmers in Lancashire are largely supportive of shale gas development. More ethnographic research would be needed in order to fully understand the relationship between the farmers and the local residents in the areas of Lancashire that are facing the prospect of fracking. Nevertheless, a few factors that may influence this relationship can be highlighted here as a starting point for a more detailed analysis.

Pressures from food retailers

Farmers in Lancashire whose businesses supply UK supermarkets may be experiencing potentially severe financial pressures. These pressures may often be hidden from public view but they have been increasingly acknowledged thanks to evidence obtained by the Competition Commission in 2000 and a number of reports in the press (see, for example, Butler, 2016; Ruddick, 2015). Pressure is put on suppliers to reduce prices and retailers use a number of tactics (e.g. arbitrarily reducing payments below the agreed level, extending credit periods, imposing wastage penalties, etc.) to achieve that goal, which enhances their profits at the expense of the suppliers. This creates excessive pressure and an atmosphere of intimidation throughout many supermarket chains in the UK (Towill, 2005). While retail sales for some of the major supermarkets have been growing, primary food producers have seen a decline in incomes by about 30 percent (Hingley, 2005). The competition on the market of food producers and suppliers has been led by the ever-expanding efficiency and cost demands, although a code of practice drawn up by the Director General of Fair Trading in the UK was supposed to remedy some of the problems (Hingley, Lindgreen, & Casswell, 2006). This research has found that many local residents are aware of those pressures and sympathise with the farmers.

Contradictory demands of agricultural work

The reality of agricultural work and food production in the UK may, therefore, be fraught with contradictory demands. On the one hand, farmers are expected to produce inexpensive food and, on the other, to 'sensitively manage the rural landscape, the welfare of farmyard animals and look after the health of consumers' (Lancashire County Council, 2014a, p. 7). Agricultural businesses often aim to achieve economies of scale but expansion may be restricted, especially in the green belt areas in West Lancashire. This means that farmers are also facing financial and other challenges related to questions about how to best maintain the profitability of their land in the context of competing land uses. Despite the social mechanisms that may endanger their profitability in the case of potential gas extraction (such as the possible loss of customers due to having a reputation that their produce is 'coming from a fracking area'), some farmers may see the revenues accrued from shale gas activities on their land as much needed support to help them remain in the food production business. Throughout the course of this research, local residents have clearly demonstrated a complex understanding of the interconnection and interdependency between agricultural techniques of food production and land management, wildlife and landscape, the food chain and a consumerist society. They have also pointed to the inequality of the distribution of potentially adverse impacts from shale gas development in that it will be the local people as well as the farmers that are most at risk, not the gas company or other entities that are advocating fracking in Lancashire and the UK.

The impacts of market-based neoliberal logic

Local residents also seem to have an understanding of the specificity of contemporary agricultural production and how it influences the farmers' relation to the land and shale gas developments. After World War II, agriculture in Lancashire became much more intensive, specialised and based on large-scale farming. Increased mechanisation, changes in the use of labour, Great Britain's membership in the European Union as well as other developments have all contributed to this

trend, however, they have not automatically guaranteed economic prosperity to all local farms. Although the circumstances are different in other countries experiencing gas developments, relevant research has shown that fracking may be especially welcome in places that are in dire need of employment (Ingle & Atkinson, 2015; Willow et al., 2014). In some areas of the US, it has been supported most by small-scale farmers who owned mineral rights but have been struggling economically and have felt that they have had limited agency to change their situation. Faced with persistent economic vulnerability, they have accepted the market-based logic and, often aware of the risks of fracking to their livelihoods, have used cost-benefit analysis to justify their stance.

Farmers are innately aware of how much their work depends on the availability of cheap natural resources. Research in the US found that when this awareness was combined with economic vulnerability, farmers who expressed their support for fracking relied on perceptions of continued growth from natural gas production to justify their stance. They also tended to believe more in the private gas companies' good intentions, ignoring at the same time the boom-bust character of resource extraction projects. According to this research, in an attempt to regain a sense of agency and control they have tried to normalise fracking, asserting that it would happen no matter what their position was on it (Malin, 2014).

Impact of shale gas on farmers

Research has pointed out that the activities of the oil and gas industry may devalue agricultural land for both its productivity as well as quality of life functions. The experiences of some US farmers with shale gas companies have been mixed (Powers et al., 2015), and many families and businesses have found themselves living in direct proximity of gas wells with only minor benefits, as this example aptly demonstrates:

> It is common in Bradford County to meet farmers and other landowners that signed a lease with the gas company but were never informed of the location and extent of the activities that would take place on their properties. In the case of one farmer in Bradford County, the gas company placed the well pad on the pasture they used to graze their cows, built the access road to the pad between their house and one of their barns, and placed an above-ground pipe carrying brine and hydraulic fracturing fluids across one of their corn fields, which burst in the freezing temperatures. In addition, the financial loss to their farming business is not being made up with revenues from gas production. Although the gas well site, including wellhead, brine separator tanks, and compressor station is located entirely on their property, they receive less than 10% of the total amount of money generated from the well because most of the shale gas is actually being extracted from underneath neighboring properties. As a result, the family has had to sell their cows, no longer uses the barn across the road, lives within 500 feet of an active gas well, is exposed daily to the noise and diesel pollution from a small compressor station, and has an approximately six acre area of contaminated soil in their corn field that they will not be able to plant for several years. In the summer of 2010, these farmers' drinking water well was found to contain explosive levels of methane and volatile organic compounds. (Perry, 2011, p. 15)

Local residents and farmers also believe that the farmers' workloads might increase as a result of shale gas operations in the area since they would need to monitor the impacts of fracking, especially with regards to possible water and soil contamination (Ben Cave Associates Ltd., 2014a). In the Marcellus Shale region in the US, farmers reported that they needed to change their management practices as a result of shale gas activities: 'In a grazing situation, it means a lot of additional fencing when you have that kind of traffic coming in and out and you're trying to keep your animals – yeah. It's a lot more management' (Brasier et al., 2014, p. 33).

Some farmers in Lancashire have expressed their concerns about the future of their businesses if shale gas development was to be allowed, worrying that even the general belief that their produce might be contaminated as a result of an industrial process going on in the area could cause 'psychological costs', drive away consumers and damage their reputation (a similar process has been observed in relation to house prices: Gibbons, Heblich, & Timmins, 2016). Some of the farmers firmly believe that this is an unwanted industry and they are not going to gain anything from it.

Although people who lease their land or receive royalties from unconventional gas activities are usually supportive of the industry (Jacquet, 2014), landowners in Australia have pointed out that the confidential agreements they signed with gas companies do not cover all activities that actually take place on their land and that no review clause was provided. They now feel trapped as they have signed their contracts for the life of the well (20-30 years) (de Rijke, 2013c). In the US, research has found that farmers felt they were not provided with enough information when they agreed to lease their land for shale gas activities. At the time, there was very little evidence about the possible impacts of fracking, thus it was easy for the gas industry 'land men' to knowingly deceive farmers and to foster false expectations about financial gain, as over one hundred documented cases from Bradford County, Pennsylvania have shown (Perry, 2011).

Community conflicts can be exacerbated if farmers ally with the gas company by, for example, receiving help to challenge the anti-fracking protesters in court.

Divisions in the countryside

More research is needed to analyse the divisions that have been created or exacerbated between some farmers and other local residents as a result of shale gas activities in rural communities in Lancashire. Evidence gathered throughout this research has suggested that fracking may have created new as well as amplified and resurfaced divisions that existed between farmers and other local residents prior to when the shale gas development arrived in Lancashire. One such prior division has beens between the local farmer families who have been in the area for generations and the 'newcomers'.

This tension seems to have structural and historical roots in that already after World War I more and more people started moving to the English countryside not for agricultural work (the numbers of those employed in agriculture started to decline in the 1950s) but to find a place to live and spend their leisure time. This growth in the population of incomers coincided with a dramatic decline in the number of farm holdings (by 45 percent in England and Wales between 1950 and 1986). Most of this decline has been due to the disappearance of small- and medium-sized family farms and an increase in larger and consolidated units. The process was accompanied by a change in the rural sociality, which is no longer based on the largely non-hierarchical labour of neighbours and family, communal celebrations and active religious activity. Similarly, the countryside saw a decline in the local infrastructure, such as shops and pubs, as well as in the network of tradespeople. At the same time, those moving to the rural areas were disproportionately middle- and upper middle-class residents. Researchers have noted the profound difference in how all of these changes have been viewed by both the incomers and the farmers. Whereas the incomers admired the tranquillity and clean environment of the rural landscape and might have sought a (romanticised) rural community, the farmers might have started feeling like 'strangers in their own land'. From their perspective, the incomers threatened to take control of the local clubs and institutions, thus making them lose their 'local' character. In the 1980s and 1990s in England and Wales, a campaign against second homes expressed the resentment of some local residents against incomers who, it was believed, threatened the local sense of community. Hence the

divisions between farmers and other residents may be based on different perceptions of the villages and communities that these two groups hold. Where farmers see the unfolding decay of their local community, the incomers emphasise the peaceful and clean environment (Howkins, 2003).

(Photo: Blackpool, January 2016)

The boomtown literature has developed substantially beyond descriptions of the local manifestations of the so-called Gillette Syndrome; for example, longitudinal studies have suggested that there might be a 'boom-bust-recovery' cycle whereby host communities eventually recover or resolve problems associated with the change introduced by the development (Brown, Dorins, & Krannich, 2005; Smith Rolston, 2013). Some studies have pointed out that the boomtown phenomenon may be more applicable to some developments but not others (e.g. offshore oil) (Luthra, Bankston, Kalich, & Forsyth, 2007). It has also been noted by researchers that the impacts can be both positive and negative, although attitudinal and political-ideological factors are not sufficient to explain why some people are more likely to perceive a particular resource extraction project as having primarily positive or negative effects (Schafft, Borlu, & Glenna, 2013). Although research has pointed out that communities are usually able to identify both the positive and negative impacts of a resource development (Schafft et al., 2013, 2014), surveys have shown that they often believe that there are few benefits that accrue to the local residents while they are forced to disproportionately bear the costs of a project (K. Carrington & Pereira, 2011). Research has also shown that easily quantifiable measures of short- or medium-term positive impacts are often outweighed by the long-term and harder to measure social costs (B. J. Anderson & Theodori, 2009; Andrews & McCarthy, 2014).

In the Fylde, rates of homelessness, violent crime, long-term unemployment, sexually transmitted infections and drug misuse are lower than the England average (Public Health England, 2015).

4.1 Community tensions and conflicts

In line with findings from the boomtown literature, this current research study has found that shale gas development in Lancashire has already had profound negative effects on community cohesion and has disrupted the residents' long-standing relations with their neighbours and other members of the community. The dividing lines run between neighbours and friends but also within families where, at times, especially women tend to be less vocal about their own opinions in order to remain in solidarity with the rest of their families (see the section on gender relations

(Photo: land close to Inskip and Roseacre)

impacts).

Some of the tensions are quite open and lead to violent confrontations, such as the one described below by a local resident that took place between her, her husband and two members of a local family who had agreed for Cuadrilla to use their land as a potential fracking site:

> Last February the tractors used to drive up and down, they still do drive very fast and [husband's name] stopped one of them and it was like a young lad who works for [family name] and [husband's name] told him off. He said: 'Can you slow down? You're going that bloody fast and you keep going onto that grass verge and making a bloody mess,' he said, 'slow down'. And this young lad: 'it's not me who's going on the grass verge'. Ten minutes later, [names], father and son, came flying into our drive. I was in the house [and I saw that] they're going absolutely mental at [husband's name]. I flew out and I had [name] senior screaming in my face, bright red in the face, spitting as he was shouting at me how he was going to make my life and eff-y misery. I had the sign on the side of the road which said: 'fracking hell coming soon to a field near you'. He ripped that off, he chucked it in my drive and they were saying all sorts, they were really really aggressive and I didn't cry, I was a bit shaky [but] didn't cry. So while [name] was going mental in the middle of the road and [name] going mental at me saying that I was a disgrace... and all this and I was trying to calm him down saying, 'I don't know how you can be like that'. We all used to be such good friends and neighbours and they're good farmers. But they've changed... We were really arguing. A bit later, I emailed our local policeman, saying I wanted just to log in that this really bad row took place today and he was threatening to make my life a misery and he was very aggressive and I just want it noted. I got a reply and they said: 'we're gonna come and see you'. So they came here and I said, I just want to log in because at that point they were driving on the front of my hedge where I keep flowers. I have always kept it tidy and they were just making it a mess really so the police took note of that.

This fragment shows that all sorts of seemingly minor tensions and disputes in the local communities may be understood by the local residents as a proxy for a more fundamental disagreement about the shale gas project. Although on the surface driving fast on local roads and going on the grass verges has nothing to do with the potential of fracking in the area, the local residents clearly immediately made a connection between the two. This may be a reaction to the fact that the LCC refused the planning application for one of the sites on traffic grounds, claiming, inter alia, that the roads around the parish were too narrow for the large vehicles required for fracking to be conducted. Destroying the grass verges may therefore be understood as an attempt to make the roads seem wider, and hence it is a relevant factor in the shale gas application. Whether it was a relevant factor or not, it is clear from this example that once the community is split about fracking, other kinds of relatively minor local disputes can also be exacerbated, thus precluding a more peaceful resolution. The cumulative effect of these disagreements can have a detrimental and potentially long-lasting impact on the local community.

It is also worth noting the formalisation of informal social relationships that was pointed out in the fragment above. The local resident called the police to have the argument 'logged in', whereas this would not have been necessary had there not been this division in the community which in the residents' accounts was brought about by Cuadrilla's applications.

Sometimes, however, community tensions are much more subtle and latent but may have a significant impact on the behaviour of the local residents. The shale gas exploration site at Grange Road, Singleton is owned by a local trust. Many houses in the village are also owned by the same trust, which means that local residents who are tenants of the trust may feel they are dependent on it. Local residents in Singleton have suggested that this has also created a division within the community and has made many people afraid to take a stand on shale gas and risk appearing to 'go against the trust'.

The decision of the trust has also obviously

created tensions with local residents opposed to fracking. What exacerbated those tensions further is the perceived conflict of interest on the part of the former chairman of the trust. According to the local residents, the land under the fracking site in Preese Hall – initially also owned by the trust – is now owned by the former chairman of the trust who also took the decision to lease land at Grange Road to Cuadrilla (the validity of these claims could not been independently verified).

At PNR and Roseacre, this research found that the farmers and landowners who have leased their land for fracking sites have also used normal farming activities in ways that are further exacerbating the social tensions. While they had never done so before, at one site the farmers dumped significant amounts of manure very close to the house of one community member who they had had an argument with about shale gas. At another site, the landowner sprayed manure slurry on the potential fracking site while the actresses Emma Thompson and Sophie Thompson were trespassing on his land with other members of the community to stage a 'Frack Free Bake Off' that was organised there by Greenpeace.

The community division experienced by the local residents has also exacerbated certain prior tensions and previously latent unequal status distinctions have risen to the surface.

The disagreements over shale gas projects seem to have reopened a fracture between the farmers and other 'oldtimers' in the local communities and the 'newcomers'. Perceptions of place, land and its role may differ significantly between the two groups and worsen the competition for the 'right' to represent the 'good' of the community. Whereas the people opposed to fracking suspect a purely financial motive for allowing shale gas exploration or monitoring to go ahead on one's land, the local farmers who accept money from the gas company may, for example, believe that they are doing it 'for the community'. This tension has caused friction that is having an adverse impact on community cohesion and old friendships; for example, almost all of the farmers in Roseacre agreed to have monitoring stations on their land. Hence they do not support local fundraisers for the planning process, which causes grave disappointment on the part of other local residents who used to be the farmers' friends.

The reasons for the individual decisions of the landowners to lease or grant access to their land for fracking activities are usually seen as complex in the local anti-fracking community. The financial motive is dominant in individual stories and there is a sense that the rest of the community has been 'sold down the river'. Similarly, research in Pennsylvania has shown that attitudes towards energy development are positively correlated with land leasing and royalty income (Jacquet, 2014). Fracking has the potential to widen social and economic inequalities in the area because the nature of the fracking process is such that one landowner gains financially for leasing their land while other community members may bear the negative effects of the exploration and extraction process. Research in the US seems to confirm that local residents worry that the shale gas projects lead to a 'gap between the haves and the have-nots' (Brasier et al., 2011). At the same time, the residents in Lancashire have noted that they do not think that the farmers who leased their land were economically marginalised or experienced pressure to lease out their land (unlike some of the accounts from the US seem to suggest) (Malin, 2014). In fact, a landowner from Becconsall who was perceived as being in financial need refused to place a seismic monitoring station on their land. Residents from PNR also recall that some farmers who originally received money from Cuadrilla later 'came round' and donated it to a hospice because they had not realised the long-term impacts of fracking.

This research study has also found that there are many complex local connections and relationships between neighbours, friends and family members that influence how vocal the local residents are about their opinions on shale gas; for example, in cases where a family member or a close friend had already accepted money from the gas company, it was rather unlikely that one would choose to speak publicly against fracking. The local residents may not want to spoil or endanger their

relationships, and this creates a difficult situation for them.

The shale gas projects have become an opportunity to use one's discretion to implicitly 'reward' or 'punish' other members of the community for some previous actions, as this local resident living in the vicinity of one fracking site recalls:

I know Francis Egan and Matt Lambert have been down there at least twice cause he [neighbour] used to tell us about it... We used to look after their garden, do our jobs. They think [husband's name] is wonderful [but] they've never spoken to [husband's name] since April because of all this. So [the neighbour] said to me: 'imagine a dart board and the bull's eye is the fracking site. The first ring, my house is in it so we will be the worse off and should be the most compensated'. 'I agree of how you're thinking this out and see this in the future' and I was going along with it. He said: 'and we want you and [husband's name] to be looked after cause it will impact on you and I have shown Francis Egan what I have done and I said well, in that we live in a semi-detached house and I've got neighbours. Yeah, but that next line, we just got you and [husband's name] cause we want you to be looked after a bit more than your neighbours'. So I sat there and said: 'right, what about [another neighbour's name]? They live at [name of place]? He said: 'they can eff off cause I don't like them' [whispers]. So you can see how it has affected some people. The thought of becoming very well off... It sickened me. I didn't say very much to him. I came home and I was a bit quiet really. I didn't tell [husband's name] until the day after. And then it was about four days after and [husband's name] was there gardening and he didn't come back for three hours because he'd the similar conversation with [neighbour] only [husband's name] was a bit blunter and told him: 'I wouldn't trust Francis Egan..., you're wrong…'. Not long after that, he'd rang [husband's name] to say that he'd found another gardener. I'm not bothered about that...

Similarly, landowners who have leased or provided access to their land for the gas company may be targeted by protesters. This research has found evidence which may suggest that the landowners near some of the potential fracking sites have become isolated in their community by disapproving residents. They have either had very little contact with residents who do not want fracking in the area or they are feeling that they have unjustly received 'bad press' and their interactions with the community may be very tense.

There have been disagreements within local families and community members have fallen out because of the perceptions of protest and prejudice against protesters, as this account from the local residents involved in the REAF demonstrates:

It was [husband's name] who spoke to [family name], big growers down the road. We were very friendly with them because our daughters went to school with their children. I said to [name] who is [name's] daughter: 'is it worth me going down to see your dad?' 'Don't bother' she said. 'I'm on your side but don't bother. They listen to just what the farmers' union tells them and that's all they're interested in. If the farmers' union says it's OK, then it is'. And when [husband's name] went down just to ask… he was really rude to him. He said: 'you're an idiot' and all these things. 'Why are you involved with all these people? They don't go to work'. And [husband's name] was saying to them: 'you're talking about doctors and people with brains in their head. What are you talking about?' They've just swallowed all this – activists are people who don't go to work. They just go around, causing trouble. So now we just don't speak.

The fracking applications in Lancashire coincided in time with letters that some landowners received with respect to manorial rights, which are historic rights retained by the English and Welsh lords of the manor when land became freehold at the beginning of the twentieth century. The letters were not necessarily related to the potential of fracking but rather a result of changes in the Land Registration Act 2002, which meant that a large number of claims to manorial rights was made and the landowners had to be informed. However, since the letters came at roughly the same time as the fracking applications and the Infrastructure Act that would clarify the issue had not yet been introduced into the law at

that stage, some of the landowners linked the manorial rights claims to the exploration and extraction of shale gas. They interpreted this as another threat, this time from the 'upper tiers of the society', thus exacerbating the social distrust based on class and status distinctions.

Despite these tensions between residents, however, this research has found that it is Cuadrilla, not the landowners or farmers, that is almost solely blamed for creating community division and conflict.

It is a widely known tactic of the resource extraction industry to fund local events, groups or projects in anticipation of a development as well as to sign 'cooperation agreements' that offer residents money in exchange for their support (for example: Kirsch, 2014; Pearson, 2013). The residents believe that some sort of agreement must have been signed in at least two cases concerning a property that is very close to two fracking sites. They have also listed many projects that they think Cuadrilla donated money to, such as young farmers' clubs, a grammar school, sports clubs, technology tournaments, in-bloom groups and village hall groups (see also the section on the relationship between the company and the communities). In general, the residents do not seem to feel that they have benefited from any of those possible donations and they do not seem to want this support. In fact, there was a short-lived call for a boycott of a local café that occupies part of a building governed by a trust that received money from the company. The boycott was withdrawn soon after it became known that the café itself had not received any funds and the owner was not a supporter of shale gas development.

It is widely believed in the local groups that Cuadrilla's donations have had more negative than positive impacts on the community and that they may have exacerbated feelings of social and economic inequality, which echoes the findings of research on shale gas development in the US as well as in the boomtown literature (Schafft et al., 2013). As one local resident describes it:

> Cuadrilla have been paving their way for many years in this area, particularly with the landowners and the people who probably have a good portfolio. They've got the resources so they spent a lot of time cultivating their landowners, people with influence, people who have got money to invest by selling it to landowners... They have had meetings with landowners where they put forward what a good thing it would be for them because... if they got approvals and were allowed to carry out their activities, then they soon would be knocking on their door to drill on their land and it's the lure of these million Pound checks being distributed around. That's effectively the psyche of a lot of landowners in the area and the wealthier people have been invited to meetings where it's being sold to them as such a beneficial process and if they invest, they would get quick returns and the like. They come in the American way of offering money to village halls, sports clubs. They simply splashed money around and they bought into, paid money to make their processes socially acceptable because they think: 'oh wonderful, we've got all this money. We were struggling as a sports club'. 'Now we've got funding to build a new village hall…' They've in effect bribed their way into the community.

In the course of this research, all local residents have felt that the company is extremely powerful and uses its financial and political leverage to limit the debate not only directly but also through the local authorities. A resident who lives near the PNR site saw a letter from the LCC to a local school that reportedly prohibited any discussions of the shale gas issue. This has been a significant concern for at least two families in the area who are worried about the health impacts from fracking that their children could experience since the school is about a mile away from the proposed site. As a result, the parents took their children out of the school, which has created an additional burden for them of having to drive their children to another school which is far away. More importantly, it has also raised questions about the democratic right of the company to have so much influence on the local authorities (more about this aspect in the section on democracy). Similar findings have also been reported from fieldwork with public servants in Australia who were pressured to silence views that may have potentially deviated from the position on coal seam gas

development that was endorsed by the government. Australian educational as well as tourist, environmental and other institutions that are dependent on government funding may fear potential budget cuts if they take a position that is not in line with the opinions of their political representatives (Mercer, de Rijke, & Dressler, 2014).

These community impacts were experienced in Lancashire even before shale gas production at scale began. The residents' view that shale gas development 'has already damaged the community, splitting families and the community asunder', as a resident from Roseacre put it, is very common. However, the literature and research from the US suggest that the arrival of large numbers of in-migrant workers can reduce the social cohesion even further. Local services may choose to cater primarily to the needs of gas workers. Local residents who no longer want to live in the area but are unable to sell their houses may be forced to rent them out, thus creating a much more transient community (Ben Cave Associates Ltd., 2014a). The high density of acquaintanceships and tight social networks may be disrupted by a rapid community change. Newcomers may also not be acquainted with the shared local histories, and cultural ties may disappear, thus altering the social structures and bonds in the community (Freudenburg, 1986b).

Protest activities in the potential fracking areas may lead to criminalisation of the local community and a much higher security and police presence, which can impact people's sense of safety.

Increasing tensions in community interactions can also diminish the quality of life for local residents (Boudet et al., 2016).

4.2 Safety

The boomtown-related literature describes increased incidence and risk of violence (including domestic violence), injury, substance abuse, vandalism, prostitution as well as feelings of insecurity among women (K. Carrington, Hogg, & McIntosh, 2011; Eligon, 2013; Walton, McCrea, Leonard, & Williams, 2013; Witter et al., 2013) in regions with rapid resource developments. Cuadrilla's own socio-economic assessment as well as the LCC officer's report mention only one source of risk to public safety coming from 'protest and environmental extremist activities' (Lancashire County Council, 2015a).

This research has found that residents feel that the shale gas developments introduced unnecessary security personnel and a higher police presence in the area. They also led to securitisation of places directly adjacent to the shale gas sites where residents were photographed while approaching the fields (more about this aspect in the section on policing and intimidation).

Cameras have been installed on private buildings as a result of the conflicts and anticipated protest activities in the community. Disagreements over shale gas projects have also spurred criminal activity that is clearly related to conflicts over fracking. In one community, more than a dozen hand-made and printed anti-fracking signs were stolen one night by unidentified men. Since the residents suspect who might have done it, this act has exacerbated tensions even further. What residents see as petty maliciousness that was provoked by disagreements over fracking might also easily turn into an offence:

> The police have kept a log of all the incidents. New Year's day, I went out because they've run really bad on the grass verges on the front of my house across the road and I spent about two hours just trying to straighten it up. Lots of people stopped in their cars saying what a mess and what's going on and oh everybody is so fed up with it. I had some cones and I put them on the road side and I thought that might encourage vehicles not go on the grass. Anyway it was about only a few days and I came home one day and all the cones have been moved so [name] checked the cameras. And it's [name of the farmer]. A few nights later, twenty past eleven at night there is [name of the farmer] and his men moving the cones again. I told police and put them back again thinking this is getting silly. And then later on that night, midnightish he's there with his vehicle. This time they took the cones away and put the cones on the back of their pick-up and drove towards the farm. I thought, all right, I'm

gonna report this as a theft, fed up with this. I asked for the inspector to come and see me and... they came and we showed them the tape and I said, they need seriously talking to cause it's intimidation, harassment and I don't need it. They're excellent, the police, to be honest with you, they've been very good. They have been to see him and they've brought my cones back. The police have. So they know. I won't hesitate. If they're doing something, I will ring the police. Police were here yesterday. They've been two police officers assigned to this area by the inquiry and I said if anything happens, I'll ring you straight away but we shouldn't be living like this, you know.

This research has shown that the shale gas activities in Lancashire have already had significant adverse impacts on the residents' feelings of personal safety and more intensive developments are likely to exacerbate these impacts further. The incidents also influence people's perception of crime and can change their view and attachment to the place. These findings are in line with research results from the US which showed that two-thirds of police officers in North Dakota noticed an increase in crime in their communities along with the onset of resource developments. Among the most common crimes are those related to alcohol (over-)consumption, such as bar fights and other instances of disorderly conduct. Other crimes are connected with drugs, theft, traffic accidents, domestic violence and prostitution. Importantly, the increase in these crimes is almost exclusively attributed to the extraction workers (Archbold, 2013; Food & Water Watch, 2013).

In the US, the increase in crime has also affected police organisations in that they need to hire more officers to keep up with the increase in demand for service. Some officers report that despite this they are unable to provide residents with the same level of service as in the past. The increased number of calls also means that officers have had to change the way they conduct their work and have become more reactive and impersonal. Some officers experience burn-out and the police force formation may face retention issues because of the heavy call load. Shortages of staff and resources may compromise the safety of the residents as well as of the officers (Archbold, 2013). Research in Lancashire has shown that local residents fear that police forces in the area are strained for resources. There has been a perceived decline in neighbourhood policing and some local police stations are being closed down or degraded; according to one resident, the police station in Lytham used to be manned by an inspector, sergeant and constables. There is now only one police community support officer for Lytham. Local residents report that this has already created a breakdown in communication between the police and residents and means that their relationship has lost its 'personal touch'. This exacerbates feelings of vulnerability and fear of crime in the area, which can further increase as a result of the fracking activities.

The health profile for the Fylde shows that road injuries and deaths are already significantly worse than the England average. Shale gas activities require many vehicle movements per site and hence will very likely worsen these statistics, as data from the US also suggests (Adgate et al., 2014; Food & Water Watch, 2013).

There is also a fear among the local residents that the company and the authorities are not seriously taking the possibility of accidents and that the local services are unprepared for an emergency scenario, as this local resident put it during the Public Inquiry:

I listened a lot of people talk about the gold standard of regulation in our country but I know the effect our public cuts are having. How with decreasing resources are they going to order this company, that has already broken safety rules, adheres to the myriad of regulations and conditions? What happens if there is a seismic incident or, God forbid, an explosion?… Cuadrilla doesn't care.

Local residents fear that the emergency and evacuation plans for the area may no longer be adequate to the nature and scale of the emergencies that may arise as a result of shale gas activities (Ben Cave Associates Ltd., 2014a). Furthermore, increased traffic and demand may negatively affect the response times of the local services, such as that of an ambulance.

There is also scepticism about the lack of impact of the shale gas activities on the water

supply as proffered by United Utilities (the water supplier in the area). However, an analysis for the LCC points out that this assessment does not mention resilience to hot weather, drought or unusually high demand (Ben Cave Associates Ltd., 2014c). There is a fear among the local residents that fracking may compromise water usage in their households.

4.3 Infrastructure and services

Shale gas activities are often accompanied by the arrival of large numbers of transient, out-of-county or foreign workers (Brasier et al., 2011). This rapid population growth may cause housing shortages and may increase the cost of housing in the area (de Rijke, 2013a; Department for Environment, Food and Rural Affairs, 2014; J. S. Gilmore, 1976; Williamson & Kolb, 2011). All of the proposed fracking sites in Lancashire are in rural areas with very little surplus housing stock, so the arrival of substantial numbers of gas workers with the onset of the extraction process poses a significant risk of housing shortages in the immediate area (Brasier et al., 2011). It may also lead to an increase in rents, which would have a negative impact especially on low-income or single-parent households in places such as Blackpool and may leave them facing displacement and cause affordability issues. It may also lead to increased and new homelessness for residents displaced from rental housing as well as of some of the gas worker families (Schafft et al., 2014).

The influx of temporary workers can lead to an increase in the cost of living, but this effect may also temporarily benefit some local shops and businesses. Some additional impacts reported in a study on Marcellus Shale developments in the US (Brasier et al., 2014) showed that:

- local businesses were changing their hours of operation and product lines to meet the needs of the gas industry;
- tourist offices were helping to inform gas workers of services and off-hours opportunities in the area;
- local companies were creating new products to serve the needs of the industry;
- new shuttle services to transport workers were being developed at small airports;
- banks were adjusting their loan services;
- schools were facing many uncertainties about curriculum adjustments to accommodate the needs of workers' children coming from different parts of the country;
- some schools were also adjusting their curricula to train the new workforce for the industry.

The last process has also already started in Lancashire with the naming of Blackpool and The Fylde College the hub for the National College for Onshore Oil and Gas that has been supported by Cuadrilla and Centrica Energy.

A draft report by DEFRA suggests that local services may benefit from the retention of business rates by local councils. However, it also points out that it is unclear whether that additional income would be sufficient to cover the costs of road maintenance and repair as well as the possible increased demand for local services (Department for Environment, Food and Rural Affairs, 2014). In the current economic climate it does not seem likely that the local authorities would be able to absorb the costs of the potential strain to services and infrastructure in the area as caused by shale gas extraction. As one local councillor put it:

> Local government is in a really severe shrinking environment when it comes to resources and areas of responsibility [are] expanding. [We will have] no ability to absorb any extra costs, particularly with the wear and tear on roads and there will be a breakdown in infrastructure as a result.

Additionally, staff from the planning authorities, bus drivers, police officers and other skilled local residents may take up jobs with the gas company, thus leaving the community struggling with less staff but more workload (Perry, 2012b). In addition to the overburdened transportation and emergency services, significant pressure may be put on schools as well as the health infrastructure and services, particularly in the immediate areas of

shale gas activities in Lancashire that are very likely to be unprepared for rapid changes (Brasier et al., 2014; Department for Environment, Food and Rural Affairs, 2014; New York State Department of Health, 2014).

4.4 Place identities

Another important community impact of shale gas development is in how it affects people's attachment to place and their sense of belonging, which has a significant effect on their health, well-being and quality of life.

During public representations to the LCC and at the Public Inquiry, almost all of the residents identified themselves by how far from the potential fracking sites they lived. Apart from the rhetorical function that this served, it also clearly demonstrated that the residents share a strong place-based identity which, from their perspective, gives them the right to influence the character of the local area.

(Photo: Roseacre Road, Wharles)

The sense of having the right to participate in decision-making that concerns their area is very widespread in local communities. This is visible, for example, by how making a reference to the terminology used in the planning documents and by the representatives of the sides at the Public Inquiry in Blackpool residents scoffed at the practice of calling them 'receptors' instead of people. Many residents felt that this had a dehumanising impact and was unacceptable. They do not agree with this treatment of the landscape issue and have often countered what they feel has been an impersonal and technocratic view of their community with descriptions such as the one below that comes from the Roseacre Awareness Group's objection document:

> The residents all belong to the parish of Roseacre, Wharles and Treales, a strong and vibrant community of 490 people (young and old) with a rich historical heritage. By its very nature this is a rural community and is therefore spread over several kilometres. We have an award winning parish primary school, a church with 150 years Christian heritage, thriving Women's Institute, local playing fields and football team, several public footpaths and bridleways, local businesses including two pubs, tea rooms, blacksmiths, farm shop, three licensed caravan parks, several livery yards and others all within 4km of the site. We have many social events throughout the year and host regular food and farm fairs several times a year...

> The applicant [Cuadrilla] has failed to identify and quantify the sheer number of people affected by the proposed development which affects not only residents but a significant number of visitors to the area using it for social and recreational purposes. The parish is used by thousands of visitors for cycling (part of the national cycle way, used by a local triathlon team for training as well as many charity cycling events), jogging and walking (also used by a local ramblers club), horse riding (also used by Lancashire Endurance riders), bird spotting, game shoots, etc. (Roseacre Awareness Group, n.d.)

Although the projects in Lancashire have not gone into the most-intensive production phase, residents who have experienced shale gas exploration have already likened it to images of an infrastructure that is out-of-place and alien to the area by invoking metaphors of invasion by space aliens and UFOs. The very same images have also arisen from research on unconventional gas and oil extraction in the US. Residents there also spoke of feelings of being invaded and occupied (Hudgins, 2013; Perry, 2012b).

The ways in which fracking is represented in the language stems from how it is experienced. Since it is experienced as being out of control, it also reflects the individual's sense of control (Jaspal, Turner, & Nerlich, 2014). When shale gas developments are compared to invasions and occupations by alien creatures, this signifies a situation characterised by overwhelming powerlessness and a loss of control.

Similarly, heavy industrial traffic, high fencing surrounding the fracking sites, surveillance cameras and security personnel, non-accessible working sites and workers' camps, new driveways, new road signs, compressor stations, drilling rigs and pipeline corridors have all profoundly changed the rural landscapes in the US and Australia, thus creating a sense of alienation among the residents (Brasier et al., 2011; de Rijke, 2013a; Perry, 2012b). If fracking in Lancashire is allowed to go into the production phase, it is very likely that individuals will develop a profound sense of alienation and many of them will look for ways to leave the area. The problem could be exacerbated further because of the risk of air and water pollution as well as other nuisances, e.g. odours. People can feel alienated not only because of the material and clearly visible changes to the landscape but also on the basis of their understanding of the risks of fracking. The more risk they think there is and the less satisfied they are with the company and the authorities' attempts to mitigate those risks, the more estranged from the area they might feel. On the other hand, this research has found that through the residents' engagement in the planning process they have begun to value their landscape even more than they had done before Cuadrilla's applications. Hence the magnitude of disruption to the landscape and the environment (either real or potential) that would occur as a result of fracking may be felt as more severe and cause acute stress, adverse health impacts and even psychological trauma (Jacquet, 2014).

The change in the landscape may also alter and endanger traditional ways of life, disrupting an individual's sense of place-based identity that depends on continuity. This research has found that the rural character of the area and the environmental qualities associated with it are exuded very strongly in the residents' narratives. Therefore, landscape clearly plays an important role in the identities of the local residents in Lancashire. Many of them pride themselves on their rural or farming heritage. Some of them who work in tourism and agriculture are dependent on the character of the landscape and the environment for their livelihoods. Shale gas exploration and extraction industrialises the natural landscape, especially with production at scale. If a change to the landscape brought about by an extractive industry clashes with closely held, place-based identities and attributes, fracking in Lancashire will inevitably disrupt the residents' sense of identity. From the basis of a cherished identity, the landscape and natural environment may turn into a source of environmental harm and victimisation (Opsal & O'Connor Shelley, 2014).

The residents have reported that the prospect of shale gas exploration in the West Lancashire borough has already led to two households moving out of the area. If fracking goes ahead in Lancashire, many more residents have also

declared that they would consider leaving the area for the fear of health and environmental impacts. This would have a significant impact on their identity, as many of them have lived in the area for most of their lives. Even those that moved into it recently did so either because of some prior attachment to the place or because they valued it for its distinct natural attributes and chose it deliberately as a place for their retirement.

4.5 New networks and empowerment

Despite the many adverse community impacts as mentioned above, fracking has also had a positive effect of creating new networks and friendships and empowering the local residents in Lancashire. People's engagement in the local anti-fracking (and likely pro-fracking) groups has had a significant emancipatory and empowerment effect. These have increased the residents' ability to participate meaningfully in the decision-making process about shale gas developments. There have been tens of thousands of written letters that the local residents sent to the LCC, and more than 70,000 petition signatures were gathered in opposition to Cuadrilla's applications. Many dozens of representations were made during the meetings of the Development Control Committee as well as during the Public Inquiry in Blackpool.

(Photos: Protesters in Preston, June 2015)

As part of their democratic engagement in the process, local residents participated in the Paris climate summit and went to speak at the House of Lords. They have been very active in writing to local newspapers and commenting on press articles online. They have also set up their own websites, e-mail lists and social media profiles that are updated frequently with news and research about resource extraction, climate change and democracy locally, nationally as well as globally.

Their activities have significantly increased their knowledge about shale gas as well as a wide range of other social, economic and political issues. They have also expanded their networking capacity by supporting and learning from other similar local groups in the UK as well as environmental organisations and campaigns. They have also improved their skill base by skill-sharing and popular learning. They have incorporated their local issues and concerns into the national and global framework.

In addition to the empowering and emancipatory impact, the residents'

engagement has also created a sense of 'community', as this member of the FFL put it:

> The overwhelming thing is that it has brought people together but now we have a community and all being a horrible thing, this is a massive positive that has come out of that. It's an irony that these companies come to a local area and they try to divide it. They throw money around... and their whole idea is to divide the community. But it's actually had the opposite effect because here in the UK, communities do not exist anymore as they did when I was a child growing up in the fifties. Real community spirit has dissipated over the years with permission of the government. These people coming to our community has brought the community together not completely but the majority of the community have come together and it's quite surprising when you drive around here and [you see] the number of Frack Free Lancs sings. Complete strangers would talk to us in the street because they recognise us from television and radio. And people want to talk about it as well.

This research has found that this sense of community is very strong within the local communities in Lancashire and the fact that it is the fracking issue that has created it is interpreted by almost all of the residents as the only positive impact of shale gas development in the area.

5

POLICING and INTIMIDATION

The shale gas applications and activities conducted in Lancashire as well as worldwide have raised concerns among many people and, consequently, have spurred protest and direct action. As a result, fracking has been banned in places such as Bulgaria, France and the state of New York in the US. In other countries, such as Scotland, a moratorium on shale gas activities has been introduced until more research about its impacts is conducted. In the UK, some local councils (e.g.: Chorley, Bolton, Trafford, Isle of Wight) have either officially affirmed their position against fracking or voted on measures that would increase their decision-making powers vis-a-vis the central government (Hayhurst, 2016). Fracking is, therefore, clearly perceived by many as a contentious and political issue, hence there is a need to investigate what effect protest and disagreement over shale gas have had on the local residents in Lancashire.

Social movement scholars have dealt with descriptions and analyses of the policing of protest as well as surveillance, infiltration, blacklisting processes and other forms of intimidation. Broadly speaking, these are understood as forms of social movement repression. Since the anti-fracking protests in Lancashire can clearly be defined as a part of a social movement (Tilly, 2004; Tilly & Tarrow, 2007), the findings of this research are reported alongside insights from the literature on movement repression.

Some forms of social movement repression are visible and direct, such as the use of force against protesters; others are more subtle and

difficult to detect because they may be more institutionalised or rendered invisible by a lack of reporting by the mainstream media (Flesher Fominaya & Wood, 2011). The overall aim of movement repression seems to be to discourage and silence dissent, which then has a number of social impacts.

5.1 Policing and criminalisation of protest

Attitudes towards the police vary widely within the broadly conceived anti-fracking movement, but locally in Lancashire one of the most significant social impacts of the policing of protest regarding the shale gas issue has been in how the residents' perception of the police has changed and is now characterised by a deep lack of trust (although this effect seems much weaker with regard to the Lancashire police). Many of the residents attended or followed the anti-fracking protests in Balcombe, Sussex, Barton Moss, Salford or Upton, Cheshire, and the first two events usually mark the moment during which their perception of the police started to shift, as this local resident recalls:

> Up till that time [the Barton Moss camp], I'd been convinced that the police were fine. They just upheld the law. They did everything right. I just could not believe what's still coming out even now of what happened there.

(Photo: Protest in Preston 2015)

The survey data shows that the overwhelming majority of anti-fracking protesters reported to have experienced or witnessed excessive or unnecessary use of force by members of the police as well as unnecessary arrests (Short et al., 2015). Furthermore, the discrepancy between the number of arrests and actual sentences (126 vs. 14 in Balcombe and 90 vs. 29 in Barton Moss) has also raised doubts among the protesters as well as some solicitors about the lawfulness of the policing of the anti-fracking protest in the UK (some charges stemming from the Barton Moss arrests were in fact later dismissed on the grounds that the police tactic to 'push' the protesters down the road was unlawful) (J. Gilmore, Jackson, & Monk, 2016; Short et al., 2015). The report containing facts behind the police operation at Barton Moss raises doubts as to whether it was truly concerned with public safety and crime prevention. For many protesters, the police actions were rather aimed at preventing the protest from being effective by using mass arrest and blanket bail. A research study on the policing of protest in Barton Moss concluded that: 'the various procedures adopted by GMP [Greater Manchester Police] in the management of the protest … had the effect of curtailing the right to protest'. It also substantiates 'unacknowledged claims that the policing operation was violent, disproportionate to the size and peaceful nature of the protest, and carried out with impunity' (J. Gilmore et al., 2016, p. 4). The protests in Balcombe and Barton Moss remain very vivid in the residents' memories and it is likely that they will continue to shape people's perception of the policing of the anti-fracking protest for many

years.

This distrust of the police is exacerbated by the perception that the policing of protest prioritises commercial and government interests at the expense of residents' rights. There is also a widespread sense that policing operations are undertaken on behalf of those interests, which has been supported by some recent research that has examined corporations' and the state's 'shared agenda in dealing with dissent' (Lubbers, 2015).

The current research also confirms that all residents who attended or followed the events at the two camps witnessed or experienced what they felt was an unnecessary use of force. The residents assessed the police response to the events in Balcombe and Barton Moss to be unnecessarily heavy-handed and overblown. Although a report on the policing of the Barton Moss camp prepared by the Police and Crime Commissioner panel found no evidence of police violence (Police and Crime Commissioner's Independent Panel on the Policing of Protests and Demonstrations, 2014), this research confirms that the residents did not seem to agree with its conclusion and often used the word 'brutality' to describe the behaviour of the police in relation to policing operations at both camps. In their accounts, physical handling by the police reportedly involved beating, pushing and shoving, stamping on people's heels and fingers, throwing people on the ground, kneeling on people, grabbing and digging knuckles into the protesters' backs. In the residents' perception, some police officers seemed to 'enjoy' treating protesters in this way. The residents also asserted that the arrests in Balcombe and Barton Moss were made for tactical rather than criminal justice reasons. Other testimonies also seem to confirm the popular perception that the arrests and police decisions about who to remove from the protests were pre-planned and pre-emptive, with a particular focus on those individuals who appeared to be useful or most influential at the protest sites (J. Gilmore et al., 2016).

The residents also reported that the violence they witnessed or experienced had a gendered aspect to it, as this protester recalls:

> [The police were] just mowing us down. I watched they had those [hard knuckle] gloves... and I used to go backwards in a line... the male cops were rude. They would rub their groin into your ass. It was really quite vile to be in that position. But there was a lot of females on the front line. So we'd all be linking arms and they'd be pressing us and I decided to start turning round cause once you've linked arms, you're fairly safe and then I got some mirrored sunglasses and I'd be in the centre cause that's where the biggest, meanest bastard was, just looking and saying: 'can you see what you're doing? Can you see what you look like? Your neck veins are out'. He looks [like] just a steroid head and you're mowing down a grandmother! 'This is what you're doing. This is what your job is. How do you feel?' ... 'Oh my God, are you're comfortable with tonight you're gonna go home and think: yeah that was really good. I mangled a spine of an 85-year old woman, I feel good'. I find this situation and the police unnerving.

Other research findings also confirm the gendered aspect of protest policing at Barton Moss which made use of gendered dynamics between the female protesters and the male police officers and left the women feeling frightened, offended and violated (J. Gilmore et al., 2016).

All of the aspects as mentioned above have created a rift between the residents and the police, especially the non-local formations. Almost all of the residents involved in the anti-fracking groups in Lancashire seem to deeply mistrust the police officers, so much so that their feelings spill over from the policing of protest to other police activities as well.

However, this research has also found strong evidence that the residents tend to be less distrustful of the Lancashire police. They have reported many instances in which they felt that it was possible to negotiate with the local police about the managing of protest and direct action. The local residents seem to have established a good and effective liaison relationship with the Lancashire police and are in regular contact with the officers. This research has found that the local residents value a good rapport with the police and would like to avoid compromising this relationship.

As they admit, however, the good rapport with

the Lancashire police is the result of conscious and continuous efforts on the part of the residents and some police officers over the past three years. Originally, the attitudes of the local police were not different from those of police formations elsewhere and were characterised by a degree of prejudice. Residents believe that due to their liaison efforts, the current relationship with the police is mutually beneficial and is maintained and valued by both sides. This is illustrated, for example, by the fact that a member of the local anti-fracking group was asked for input into a Chief Inspector's address to a group of senior officers about Lancashire's police handling of anti-fracking activities. This is how one of the residents described the way in which their relationship with the police has remained important in ensuring their right to protest:

(Photo: Policing in Preston, June 2015)

By bringing together the campaigners and the officers responsible for policing our activities we have over time, I believe, developed a mutual respect and a degree of trust which means that we will be permitted, indeed enabled, to hold our peaceful protests and you only need to deploy the minimum number of officers. The main events we have seen at County Hall, Preston last year and Blackpool Football Ground earlier this year have been completely trouble free and I am pleased to be able to say that the people who came to support us from all over the country went away saying how different the policing had been at those events compared to what they had seen elsewhere. So for all parties this works; discussion, negotiation, agreement, being consistent, being professional, being respectful. If in the coming weeks the Government overrules Lancashire County Council's decisions then things will undoubtedly become more challenging but I believe that the foundations we have laid here will stand us in good stead.

5.1.1 Criminalisation of protesters

Another reason for the distrust between residents and (certain formations of) the police is the fact that the community members feel that the police is attempting to unjustifiably criminalise them, which is contrary to the way the majority of residents see their activity as a protest of 'ordinary persons'. This is how three local residents put it:

Early in 2014, I actually joined a protest along the front in Blackpool… We saw for the first time quite a heavy police presence, which unnerved me a bit because I have been a low-abiding, well-behaved citizen all my sixty years on this planet and I have never thought I would be in any way coming into conflict with the police or doing anything that wasn't right… And they were calling us anarchists and I'm thinking: 'I'm not an anarchist. I'm just an ordinary person'.

The police are brutal as well. The way they treat the people that are paying their wages, the ordinary people. Seeing them stamp on people's fingers, they're brutal... I have no time for the police. I said – I have two grandsons – I

said to them: 'No matter what you do in your life, do not go to the police force'.

The brutality, I watched how a guy got thrown off his cycle, watching the way the men handled [name], stuff like that. Why is it that you, even as an intelligent tax-paying grown-up, say: 'do you know what, I think my government's decision on that is wrong'. What sort of a country do we live in that suddenly marks me as a criminal? I remember one day standing on Barton Moss just at the edge of the Barton Moss Road and I was talking to one of the senior police. I said: 'if I called you for help if I was being harmed in some way, would you come and help me?' He said: 'of course, I would. It's my job'. And then I just stepped across the line on the Moss Road and I went and I said now I'm gonna ask you for help cause there is a woman down there, she's being manhandled by a man in a uniform that looks a lot like you. I need your help and... and he just blanked me!

This criminalisation is often understood as part of police prejudice against protesters in general. Researchers in the US also found that public relations professionals were advised about the benefits of employing military 'psy-ops' techniques to persuade people to support shale gas extraction and deal with the 'insurgency' (Hudgins & Poole, 2014). The language of criminalisation of protest echoes the historical tendency of the state to label politically undesirable activity as a crime and the police to use high-scale policing on the basis of information from the press or popular perceptions (Cox & Ní Dhorchaigh, 2011; El-Enany, 2014).

Additionally, the current global context is shaped by the 'war on terror' and the perceived increase in the threat of 'domestic terrorism'. Although this research has confirmed that the anti-fracking protests are overwhelmingly peaceful and aim to stop gas exploration and not to harm any person, these global factors have indeed had an influence on how the policing of protest is conducted. Furthermore, this research has found that the local residents make a clear connection between the criminalising actions of the police and the government's declared interest in shale gas development. As one local councillor put it: 'if the state declares that it wishes to go ahead, then state agencies will be undertaking the agenda of the state'.

Many local residents clearly do not identify themselves with the stereotype of a 'protester' and are actively looking for ways to counteract this negative image that is also being perpetuated by the media:

At the march in London, I thought the police were a bit, they look at you like you are dirt. That's the impression I got... I said to one or two people we should organise a march and tell people to come in their Sunday best because the perception of anti-frackers is men with beards and tattoos and women, I don't know. We're not all like that...

Box 5.1

Anne Power, a member of the Barton Moss community protection camp, won the Observer Ethical Awards 2014 in the 'local hero' category.

"I stand as witness in court looking like a respectable citizen, which helps the judge decide they're not dealing with morons, layabouts and hippies, but clever, dedicated people, giving up their lives to a cause."

Local residents engaged in protest have a clear understanding that the police may see them as a part of or working with the 'rented mob' – as one resident recalls a police inspector called the protesters in Balcombe. They do not agree

with this label, which they see as an expression of 'blind prejudice'. As concluded in the research report on the policing of the Barton Moss camp (J. Gilmore et al., 2016), Greater Manchester Police adopted a tactic that sought to distance the protesters from the local community, suggesting that they were unreasonable and 'regular' (i.e. non-local) activists. Examples of this insider/outsider framing are very common in the context of grassroots mobilisations and direct actions. The frame suggests that the 'outsiders' should not become involved in issues that do not concern them directly. However, it is important to note that there is a logical inconsistency between the insider/outsider and the NIMBY frames that are often applied simultaneously, i.e. the latter framing implies that the issue is not local only, the former that it is (Hilson, 2015).

However, even a local and relatively low-key protest could be subjected to the same policing tactics, as was the case of land occupations and other direct actions. This is how a local resident described her experience:

I do feel that we're not treated as protesters whose voice should be heard either by the press or the police who are treating us as criminals almost really. The amount of police presence whenever we hold something is absolutely ridiculous. In all the years we've been doing this, we have never shown any sign of violence... so why they should think that we need all this ridiculous police presence? When we held meetings on the Green in Lytham like a picnic for children and farmers, there was police there with a camera man. They shouldn't be taking our pictures. Why are they doing it? Are we on some list somewhere, you know? Do not allow this woman in, she's an activist and she should be banned! [laughs]

This local resident highlighted an opinion that is widespread among the anti-fracking protesters that there has been an excessive police presence at the grassroots and peaceful protests in the area. She also pointed to another criminalising practice which is blacklisting activists (Smith & Chamberlain, 2015), the effects of which some engaged residents in Lancashire have already experienced (more about this aspect in the sections below).

The image of a rented and unruly 'mob' is also in direct contrast to the residents' self-image as 'conventional and respectable' (many of them are also retired) members of a local community who also work for many local organisations and charities. Furthermore, there is a clear attempt among the residents to break down social barriers through protest, and many admit that they have changed their views of others as a result of their engagement and meeting with people from outside their social circles.

Social movement and politics scholars have pointed to the phenomenon of the contradictory effects of repression in that excessive police presence, unnecessary violence and arrests or the criminalisation of non-violent protesters have in many cases galvanised protest and increased mobilisation (Koopmans, 1997; Lichbach, 1987).

5.1.2 Direct action

The experience of the road programme of the late 1980s and early 1990s in the UK as well as various other protests around the world have shown that once those who oppose a development exhaust all possible legal routes and the government is perceived to push for it regardless of the local opposition, residents usually resort to direct action (Bradshaw, 2015). This research has found that almost all of the local residents opposed to fracking in the area declared that they would undertake direct action if shale gas exploration and extraction was indeed allowed in Lancashire:

To say the truth, I can't see it going ahead but if it did, it's sort of like fantasy land. If it was near me? I would have to do my best and lie in the road or something. I would not really lie in the road; I'm not quite as good but maybe chain myself to something.

Anything really [answering the question: what would you be prepared to do to stop it?], direct action. I think we're probably going to go the legal route – the European Court but direct action – if that's what we have to do and of course, it has worked in various places so it does work.

I would be prepared to walk in front of the trucks to stop them. There is no way that I will let those trucks to go through Roseacre one

way or another. I will be there with or without a walking stick [laughs] with my Frack Free Lancashire T-shirt on, with my hat on, walking slowly, very very slowly in front of those trucks.

If it gets a green light, I would be one of these people that would be trying to stop wagons. I said [to a police inspector]: 'I'm telling you now, if I am led to Dagger Road [Roseacre], you try and move me'. And I'm looking at him and he went: 'ee, ee'. We all laughed about it. I said: 'if I'm led to Dagger Road, you'd have a job to shift me. I will pull up a fight'. You know, you start thinking how could we stop all these great big tankers. We'll got to get a lot of manure dumped on the road and make life difficult. I'll do something but you shouldn't have to think like that, should you? It might come to that.

Even those who do not feel comfortable about participating in a direct action themselves always declare that they would support it. What comes out of these as well as other conversations with residents in Lancashire is that they do not only overwhelmingly declare their will to engage in or support direct action, but also that there is a sense that it will be legitimate and legitimised by the predetermined pro-fracking stance of the central government. There is a widespread understanding, not only among those opposed to fracking in Lancashire, that protest may be the only way to make people's voices heard, as this local councillor conceded:

I'm not making a judgement on those people [anti-fracking protesters in other parts of England] but they might have stepped over the mark. But is it any different from those women who stood outside protesting in the 50s? When people really believe in something, this is what we are really good at, isn't it? That we actually say what we think. What we've learned is that you have to do that to get the other voice heard.

Since many of the engaged residents are elderly, retired and/or with disabilities, they also imply that if the police try to repress their protest, this would have a counterproductive effect and increase mobilisation instead of suppressing it. They believe this may also help convince public opinion that fracking should not be allowed in Lancashire and in the UK. Direct action is perceived as a weapon of last resort to 'stand up for [the local] community', and it seems that residents will take pride in defending their communities in this way, as this local resident recounting an event at the site in Becconsall puts it:

When they [site security] were behaving the way they were and the police stood watching and they got away with it, that's when I wanted them to arrest me because I haven't done anything all my life. I haven't had a parking ticket, haven't stolen anything, I've got a completely clean record. And so for them to arrest me for that shows how important it is. It's important that we stop them and they have to realise that they won't get away with [it].

5.2 Surveillance and intimidation

A number of high-profile cases have recently been exposed of systematic police surveillance of activists in the UK (Lewis, 2014). This happened in a climate of already heightened popular awareness of the state's surveillance methods and capabilities thanks to such developments as WikiLeaks and the work of Anonymous. With the intensification of the 'surveillance state' (Harris, 2010) in many Western countries, many people may feel that citizens' liberties have been eroded (Fierke, 2007).

This research found that the local residents had many concerns about the security of information and police surveillance of their social media sites, e-mail lists, accounts and telephones, which echoes the research findings and media reports from other places in the UK as well as Europe (Litwiniuk & Cirocki, 2012; Neslen, 2015; Short et al., 2015). There is a widespread concern in the communities that the police may not only be monitoring the residents' Internet activity but also tapping certain people's phones. In the course of this research, evidence arose that may suggest that the police are monitoring the websites of the anti-fracking groups in Lancashire. There are also some fears of possible infiltration and uneasiness about video surveillance of the protests. At the same time, some residents are unwilling to sever their relationship with the local police on this basis. Nevertheless, local groups have adopted a certain 'security culture'

(Cross & Snow, 2011) that is characteristic of many social movements. As part of this culture, members of local groups may prefer face-to-face interaction to e-mail or telephone conversations, especially when strategy or future actions are being discussed.

The residents also report possible surveillance by security personnel employed at the drilling sites as well as other unidentified people. According to the residents, they have been followed in their cars and watched from outside their homes, they have been photographed and recorded, drones have been used to invigilate them, there have been attempts at planting a 'bug' during one direct action as well as to listening to meetings, and police officers have come to their homes to ask questions. This has had a significant negative social and psychological impact not only on the residents who experienced these activities directly but also on the entire communities. Rural areas in the Fylde borough are generally considered to be quite 'respectable' and police presence is rather low-key, which has exacerbated the effect of shock from the perceived increase in surveillance. Local residents have felt frightened and intimidated and believe that their right to privacy has been violated, as these local residents put it:

- A lot of people would have been intimidated by that [surveillance] cause myself and a neighbour [name], we were followed in a van with cameras... and I knew we were being followed because someone I knew was actually employed by the security company... That's just an example…

- It was when they thought there might be an occupation of the field by one of the activist groups so they literally put the security people on but they also put a section 26 notice on the gate but when you went up to the gate to read to notice, the security person arrived and took your photograph.

- It was too heavy handed, really.

- I think it was because they didn't understand the nature of the beast here. We're just a resident community. We were shocked to see that level of security.

(Photo: Policing in Upton, Cheshire; January, 2016)

I don't want you [the police] to know everything in my life and... I don't particularly care that you know. I don't want you to but by the same token, I haven't done anything that I'm ashamed of so I'm not as bothered [but] I just find it intrusive and possibly presumptive of them to assume that I am a criminal and that I have no right to my privacy. But I have no fears about what it is they've got. But I just don't think they should have a right to intrude on my privacy and I don't doubt that lots is collated.

Particularly worrying to the community have been signs of possible police collusion that targeted effective activists. The residents described a situation when in the morning before a direct action, bailiffs and the police arrived at the workplace of one activist. It was not her home address and she was not registered as being there. Nevertheless, they threatened to confiscate goods from the workplace in order to collect some minor debt that she did not realise she had. This story is consistent with findings from movement research which documents cases in which local activists were targeted by the police even long before any protest took place (for a comprehensive bibliography on the alter-

globalisation movement, see: Mac Sheoin, 2010).

As a result of increased surveillance, the residents have also become much more distrustful towards the police, the company's employees as well as strangers in general. These residents, living near the PNR site, talked about this in terms of a 'lockdown' that can be considered as a part of the movement's 'security culture' as well as strategy:

- We've become very very wary. We've opened our hearts because we think that everybody is like us. We've shared information and we've found out it's very often to our detriment... [I have become] a little bit suspicious and I'm very protective... I was very concerned because [name] has been put up there on a limb not just for our own group as a mentor but also for Cuadrilla as a target and I was really concerned after the surveillance… [that] they wouldn't stop at anything and so a new face, I'm immediately: 'lockdown'... Normally my doors are open... It was also as we were getting much more tired, I was really concerned... We used to have our meetings in here and we found that there was a leak. There was obviously somebody who was having coffee on the other side so this is where the lockdown [came from]… You might say it's a form of paranoia but this is our community, means of our lives are at stake.

- I think it was when we went to the strategy bit..., we needed to ensure that we had a clear path but also that we didn't put it out there...

- It's not even intentional. It's like talking over coffee: 'Oh, [name] is got a balloon going up'. It could be just a little throw away comment and our plans could have been scattered.

The experienced and perceived surveillance has made residents feel intimidated and as being constantly 'under the watch' of the police or the gas company. One of the most significant social impacts of the shale gas developments in Lancashire is the atmosphere of intimidation and secret surveillance that has been created, as this local resident described it:

You just felt it. There weren't any problems. We didn't create any trouble. We didn't go looking for trouble. They didn't want any trouble. There was an atmosphere, you know, it was very 'us' and 'them'. Most of the time [at the Anna's Road site], the gate was shut and there was a patrol car and men out there. I drove there a couple of times so they would suddenly come out and ask you what you wanted. They were always there; it was always protected and there was CCTV and all the rest of it. But you just feel that when they have to have the big PR machine, they have to have a spokesperson between you and them and they have to have fences and guards, you feel that they have a lot to hide. Instinctively, you can feel that, no doubt about that. You can feel the pressure.

Part of this atmosphere that has made the residents feel 'under pressure' can be attributed to the securitisation of the drilling sites (the use of cameras, security guards, etc.), which is common not only in places where resource extraction meets local resistance but also in underdeveloped areas where powerful commercial interests collude with personal-political gain or narratives about national security (Marriott & Minio-Paluello, 2013). Some residents pointed out that site security personnel tended to act as if they were an extension of the police force. Throughout this research, many residents reported that they had been approached or photographed by site security simply for stopping outside the gates to read the information notices. This is how a local resident describes one such encounter:

I remember one time we just wanted to have a look at the PNR site whether they were going to do their job. I remember pulling up outside the gate... and we were just looking at the gate cause there were some signs... There were two guys probably ten yards away looking at us... and we were there for about two, three minutes, no longer. [A security guard] went to his car, took his camera out, walked towards me to take my picture at which point I took my phone out and pretended to take a picture of him. I found that intimidating because why are we not allowed to stop outside the gate and read signs on the gate? Showing an interest because that's why the signs are there so that you can read them. Why should that be a problem to this company? It feels very heavy when you're around Cuadrilla.

The residents believe that the securitisation of the drilling sites has been excessive. The

atmosphere of intimidation and mistrust that has been created as a result of this is having a negative impact on the image of the company itself. The prevailing perception is that high security means that Cuadrilla is not being entirely open and transparent about its activities. The heavily securitised response to the residents' interest is also interpreted as a sign that the company is treating local residents as potential intruders and trouble-makers, which is contrary to the local residents' own self-image.

The residents also believe that the legal system may not be adequately protecting them from, what they experience to be, the company's intimidation tactics which restrict their democratic rights; for example, the gas company took legal action to evict peaceful protesters from a field that they had been occupying for three weeks in August 2014 (the field was voluntarily cleaned and vacated by the protesters without the need for police intervention). The occupation was dubbed 'the Nana camp' since it was organised by the Lancashire Nanas group and those who occupied the field were primarily local mothers and grandmothers. As a result of the legal cases brought forward by Cuadrilla, an anti-fracking activist and local resident, Tina Rothery, who asked to be the named defendant in the trespass case, was ordered to pay more than £55,000 in legal fees. The statement that she made at the Blackpool Law Courts in June 2016 summarises commonly felt feelings about the imbalance of power between the local residents and the gas company and the effect residents believe it is having on democracy and justice:

> With respect to the District Judge and the courts I have huge admiration for a system of justice that is fair but I feel in this case that our law courts are not being used to seek justice but instead being applied like a weapon and a threat against peaceful protest.
> The fact that Cuadrilla has the finances, power and vindictiveness to pursue this throughout courts is an abuse of one of the most valued aspects of our democracy.
> So please accept my apologies if this seems rude but as this case has nothing to do whatsoever with justice, I will not be complying with any requests for information or payment. I make this statement on behalf of myself and an entire movement who will not be bullied.

The company has also sought and was granted an injunction on behalf of a group of landowners to prevent the members of anti-fracking groups from entering land throughout the Fylde. It has also issued other legal warnings, e.g. it has threatened one local resident with legal action concerning a brochure detailing the risks of fracking that has been distributed locally despite the fact that the brochure had no reference to that resident as its author.

This research has found that members of local communities have also experienced intimidation from the local authorities, pro-fracking groups, business as well as agricultural organisations because of their stance on shale gas. One local farmer was summoned to court for displaying anti-fracking signs on his property without appropriate consent. There seemed to be unusually determined effort on behalf of the officers from the local borough council to document the number of signs while, as the residents claimed, they had been in the same place for years. What changed was that instead of an advertisement they conveyed an anti-fracking message. Some residents pointed to the insistent 'trolling' on social media. One local resident had a picture of his house posted online by a member of a pro-fracking group, and a few community members believed they had been stalked by pro-fracking group members. Other residents were asked to leave certain agricultural shows, and an individual who was a member of the regional Chamber of Commerce was not allowed to take part in one of its events because he was not in favour of shale gas development. These incidents bear the signs of blacklisting processes and, cumulatively, they have had a significant effect of creating an atmosphere of conflict, distrust and intimidation in the local area.

6

DEMOCRACY

Evidence shows that debates about the siting as well as the economic and social viability of shale gas developments in the UK have become politicised. Demonstrations against (and to a much smaller extent in favour of) fracking have swept across the UK and many other countries in Europe and beyond. Through a series of mobilisations and campaigns, and following the recent wave of pro-democratic movements such as Occupy and Indignados (Sitrin & Azzellini, 2014; Szolucha, 2016) in the popular political imaginary, unconventional fuel extraction has become strongly intertwined with the crisis of liberal representative democracy. It has also led to changes in popular beliefs, values and, in the long run, it could potentially reshape the democratic model of governance itself. Hence there is a need to explore the impacts that shale gas development has had on democracy.

At the grassroots level in the UK, the discussion about shale gas has extended beyond the planning and technical aspects of the exploration and extraction process to incorporate notions regarding equity and fairness in the distribution of impacts, alternative visions of the social good as well as loss of subsidiarity. One of the most evident social impacts of shale gas development in the UK is in how the residents' engagement in campaigning and/or the planning process has dramatically changed their views about democracy and made them disillusioned about politics and politicians. This dissatisfaction with the performance of some of their political

representatives has had a deeply politicising effect.

Locally as well as within the wider anti-fracking movement as a whole, the politicising effect of the shale gas debate (Kinniburgh, 2015) has been enhanced by the fact that the relationship between fossil fuels, climate change and democracy has also been widely discussed by such influential intellectuals as Naomi Klein, who has claimed that the current environmental crisis could unify all different social movements not only to tackle climate change but also to create a fairer and more democratic world: 'As part of the project of getting our emissions down... we once again have the chance to advance policies that dramatically improve lives, close the gap between rich and poor, create huge numbers of good jobs, and reinvigorate democracy from the ground up' (2015, p. 10).

In social movements, the critique of the representative model of democracy seems to coincide with greater ecological awareness. According to some scholars, in green politics generally, ecological sustainability and more participatory and direct forms of democracy are perceived as mutually reinforcing (Barry, 1996; O'Riordan, 2015).

Historically, energy flows and the organisation of fossil fuel extraction either opened up or limited the popular power of workers and other citizens to articulate their democratic demands. The socio-technical arrangements required for the extraction and distribution of carbon fuels enabled particular kinds of democratic or undemocratic politics; for example, the rise of mass democracy in the West in early modernity was connected with the narrow rail channels where coalminers and the labour movement could exert pressure on the political elites. The era of oil that began in the early 1970s helped stimulate Keynesian economic theory and ideas of limitless growth (Mitchell, 2009, 2011). Fossil fuel extraction and distribution, therefore, have been intimately entangled with modern politics and democracy in the West. Transitions from one form of fuel and energy to another have also been 'not simply exercises in swapping fuels and changing technologies, but disruptive events with the potential to remake societies in fundamental ways' (Melosi, 2010, p. 58).

Fracking presents a new set of labour, technical and political arrangements that may potentially influence the current model of democracy in the UK. The labour force working for shale gas projects is largely non-unionised, transient and disaggregated, hence it is less likely to exert pressure on the government or their employer. People most adversely affected by the drilling tend to be many in number and live in proximity of the sites. However, the major benefits of gas production accrue to a few individuals (Hudgins, 2013).

Shale gas development contributes to growing concerns about the impacts of climate change worldwide and, consequently, raises questions about the role and capacity of democratic countries to deal with the possible effects. A review of the relationship between democracy and climate change shows that an environmental crisis may create new stresses for democracy because many of the impacts of climate change will have serious and wide-ranging social and economic implications. If there is a change in the values in a society, an environmental crisis could entice an improvement in democratic practices but it may just as well erode democracy and lead to a period of authoritarian rule that will or will not respond to the challenges of climate change (Ward, 2016).

The liberal representative model of democracy in the West is seen by some as particularly prone to difficulties in tackling climate change (Runciman, 2015) because of its short-termism as dictated by electoral cycles as well as its apparent inability to take into account un- or under-represented needs and interests (Ward, 2016). It is, therefore, pertinent to analyse how local shale gas projects may influence the residents' ideas about democracy and their participation in democratic practice.

6.1 'It's no longer about fracking, it's about democracy'

All local residents in Lancashire throughout this research have been forceful in their opinions that the government's insistence to extract shale gas in the country is undemocratic because it is against the will and best interest of the local people as well as the entire

population of the UK. Department of Energy and Climate Change (DECC) statistics also seem to show that there is little support for shale gas extraction in the country (19%) (Department of Energy and Climate Change, 2016). The government and the company are perceived to be imposing this development upon recalcitrant citizens, which nullifies the government's democratic mandate and renders void the idea of democracy itself. At one public meeting a local resident conceded: 'We're fracturing democracy in order to get fracking through'. This is how another two local residents assessed the decision of the Secretary of State to call in the decision about whether shale gas exploration and monitoring should take place in Lancashire:

> Now it's being dictated from the top. The man who is going to decide on fracking sites is not going to pay any attention to the [Planning] Inspector. He says he will decide. That isn't democracy. In the end, it is a politician who will make a decision.

> This is where we are now – it's the actual pressure that's put on people... [because] something we think is so wrong... is being imposed on us. Lancashire County Council decided against it for, we think, valid reasons and yet the government, they say, nationally we want to drive this through and Greg Clark stepping in to, we hope not, but to override local democracy... At the end of the day, we elect our county and borough councillors to represent us and to make right decisions and they listen to us and they are local and we have a voice and most of the councillors have been brilliant. They listened to what we had to say and what Cuadrilla had to say, to both sides and they decided using planning policy... whether it's right here.

As the last fragment suggests, the widespread view that shale gas development is being imposed on UK citizens and Lancashire irrespective of local objections is being backed up by the fact that the local democratic representatives in the county decided against it in, what is perceived to be, a very thorough and fair planning process. Residents have spent much time and their own resources to be able to participate in this process as well as in the subsequent appeal. Hence the fact that after more than two years the final decision about shale gas in Lancashire will be made by one politician who is a part of a government that is in favour of fracking is met with widespread resentment and concern. For the residents, it seems to render meaningless all of the grassroots efforts they have put into building their case, which makes people revisit their long-held political beliefs, as this local resident aptly demonstrates:

> I think the appeal process has been going very well but of course, if it's going to be totally overruled, it would make it into a nonsense, won't it? … The woman in charge [Planning Inspector] looks reasonable. The difficulty is that it is not her. It's the others further up who are. When you hear about their backgrounds and connections, their involvement in companies and being lobbied by all those people, you do get an impression that there is no democracy at all. There is an absolute sham... Before this, as a true Lib Dem, I was convinced of the value of elections. [laughs] I wasn't as cynical as I certainly am now.

This research study has also shown that residents engaged in the planning process, who have been Conservative voters over the years, are declaring that they have stopped voting for the party as a result of David Cameron's government stance on the fracking issue. However, it may be difficult to verify this claim, especially since in the last local elections in the Fylde the Conservative representative won by a huge majority. At the same time, however, he received fewer votes than in 2010. In 2015, two candidates (independent and Green) who ran on an anti-fracking platform together received about 30 percent of the votes obtained by the Conservative candidate, which shows that the fracking issue has become important in the local perception.

Residents are critical of the ruling Conservative party, not only because it is openly pro-fracking whereas the majority of them oppose it but, even more importantly, because the government is perceived as failing to listen to the 'ordinary people'. Community members have become disillusioned with the Conservative party because they believe that the government's actions as regards shale gas promote the interests of a small group of

people at the expense of others, i.e. they have challenged the proposed developments from the position of equity and fairness of the democratic distribution of impacts. This is how two local residents explained this change:

- I'm ashamed and embarrassed to say that I have voted Conservative all my life. I am obviously one of these ladies that looks like a traditional Conservative voter... I thought they were the party that stood for people being responsible for themselves, for their families, for their future and I genuinely believed that they were the party that represented that and I've been completely disabused of that because what I've come to understand is that it isn't like that. That basically, I think in this country, that they are a small number of people looking after a small number of people and unfortunately, I don't think that they've learned how to listen to ordinary people. There's been so many times in the last two years when I thought to myself, you know, how can they not listen? This is meant to be a democracy, not an autocracy. And yet, despite two hundred anti-fracking groups, despite constant calls for a moratorium, they're continuing to reject what the people are asking for and so for me, I'm completely disorientated with the Conservative party and as I say, I was probably one of their most ardent supporters.

- I think the same goes for the majority of people around here. This is primarily Tory, the age demographic. They've picked the target audience perfectly and I've done a complete switch like that. [snaps her fingers] I was brought up Tory.

- …I think that really what we're seeing is a party that says one thing today and reverses it tomorrow and how can you actually trust that party?

- There is an element of that in every party. They promise one thing and do another but it's just how much they changed. The climate change is an example. In Paris they were not just changing their minds, they're throwing it in people's faces...

There is also a widespread perception among the local residents in Lancashire that the reasons for the government's position on shale gas are inconsistent and not entirely transparent. In some cases, they are seen as contradictory to the country's international commitments and national targets as regards climate change and greenhouse gas emissions. This seems consistent with the views of experts, who have repeatedly pointed out that if the UK is to abide by the commitments of the Paris Agreement to hold the increase in global average temperature to well below 2°C above pre-industrial levels and to try to limit it to 1.5°C, there is no emission space in the country's carbon budget for shale gas to act even as a transition fuel (K. Anderson, 2016; Broderick, 2015; McGlade, Pye, Watson, Bradshaw, & Ekins, 2016). This inconsistency is hardly specific to the current government, and scholars have also noted that similar contradictions in relation to, for example, the UK aviation strategy were also evident during Tony Blair's and Gordon Brown's terms in office (Hayden, 2014). By pointing to the political incompatibility of the government's declarations, residents have revealed something that is theoretically conceptualised as the 'synergy illusion', i.e. a rhetorical mechanism based on the idea that all decisions work together and reinforce each other and there is no conflict that will result even from seemingly contradictory moves (Pedersen, 2015).

Local residents treat the potential economic benefits of fracking as overstated and do not agree with the government's narrative that a domestic fossil fuel would enhance the country's energy security. This seems to be consistent with the findings of the Energy and Climate Change Committee at the House of Commons. The Committee's report (2011) on shale gas noted the uncertainty as to the extent to which domestic gas extraction could drive the price of conventional gas down, which has been echoed by the findings of an EU impact assessment (European Commission, 2014). The Committee's report also concluded that the effect of shale gas on energy security was unlikely to be enormous and stated that security of supply considerations should not be the main driver of policy in relation to shale gas extraction.

The residents are also sceptical about the number of jobs that the government professes will be created as a result of the exploitation of

shale gas. In fact, in a letter to a resident, a local MP also distanced himself from the figures used by government officials and promulgated by the auditors of Ernst & Young in a report for United Kingdom Onshore Oil and Gas (UKOOG). The report suggested that upwards of 62,000 employment opportunities may result from shale gas development.

Since the residents do not seem to be able to find a rational explanation for the inconsistencies in the government's position on shale gas in relation to policy and evidence, suspicions and rumours about personal gain and corrupt intentions abound in informal conversations. Connections between governmental ministers, the gas industry, the regulatory bodies and PR companies (Mobbs, 2013) are pointed to as evidence that the government does not have the best interest of its people at heart in promoting shale gas development. This is how a local resident commented on the personal connections that she believes exist between George Osborne and Cuadrilla:

I don't think we've got a democracy, that's how I feel. I really don't think we have… It's horrendous. We haven't got a democracy. No matter what anybody thinks. It's a fantasy. That's the word for it.

Another resident put it in similarly stark terms:

knowing what the government, what our so-called elected representatives are prepared to put us through just so that they can get money, just so they can please their buddies in the oil and gas industry. No, I think I'm quite justified in showing my disrespect for that kind of democracy.

The residents' disillusionment with the way the mainstream media have reported on the opposition to fracking (e.g. by understating the number of protesters at the marches) has also amplified the politicising effect of their engagement. For the majority of local residents in an overwhelmingly Conservative-voting area, this happened through an eye-opening moment as a direct consequence of the fracking applications, as these residents recall:

- When did you start to realise these things about democracy?

- When we retired [laughs].

- When fracking happened, I didn't know anything. We were the people who just paid our bills and got on with what we were doing and thought we lived in a democracy and then all of the sudden, fracking came along and once you get actually looking into what's going on, [you find] things that are unbelievable.

6.2 Loss of subsidiarity

In the foreword to the document explaining the provisions of the Localism Act, the former Secretary for Communities and Local Government wrote:

For too long, central government has hoarded and concentrated power. Trying to improve people's lives by imposing decisions, setting targets and demanding inspections from Whitehall simply doesn't work. It creates bureaucracy. It leaves no room for adaptation to reflect local circumstances or innovation to deliver services more effectively and at lower cost. And it leaves people feeling 'done to' and imposed upon – the very opposite of the sense of participation and involvement on which a healthy democracy thrives. (Clark in: Department for Communities and Local Government, 2011, p. 1)

Similarly, about the planning approach he said:

Today, I want to talk about this government's proposals for planning: how we can make the system straightforward and transparent: how we can restore democratic control, the better to respond to local need; and how we can unblock the system to make it more effective at fulfilling its essential role enabling sustainable development…

The last government resorted to imposition – this government believes in participation. The last government used to take responsibility ans assume control – we want to give people real choices, and enable them to see the real consequences of those choices. (Clark, 2010)

In the local residents' views, these and similar explicit declarations about 'local control' and responsibility directly contradict the reality of the planning process in Lancashire. There is widespread feeling among people interested in the shale gas issue in Lancashire as well as

nationally that the move of the Secretary of State for Communities and Local Government to call in the decision about shale gas exploration in Lancashire has violated the principle of subsidiarity. The principle refers to the notion that decisions should be taken as close to the people who will be most affected by them as possible.

The residents have also noted the evident contradictions between Greg Clark's decision and the Localism Act as well as his statements concerning the new planning approach. Both the Localism Act as well as the planning approach have been portrayed in a way that seems to suggest that they are aimed at decentralising and devolving power to lower scales of governance. However, local community members have interpreted the new National Planning Policy Framework that is supposed to simplify planning to as actually creating 'fertile ground for legal challenge' and necessitating a number of written ministerial statements that have reshaped the NPPF in such a way that it is more in line with the possibility of shale gas extraction. They also construed the Secretary's decision as an 'erosion of the so-called localism' which 'makes a mockery of the local democratic process because [fracking applications were] thrown out overwhelmingly' at the local level, or, as one resident living in the vicinity of the PNR site articulated it:

I think the thing that I have found the hardest to swallow is that the Localism Act of 2011 said that it would devolve power back to the communities because they are best able to shape and form their communities and that's absolutely right. And the [former] Secretary of State, Mr Clark, who will make the decision on our inquiry is the chap who has written the introduction and that's his statement. So I find it at odds that I'm now in the position whereby having said that we would devolve all power back to the local communities, because they didn't get the result that they wanted in relation to shale gas, they're clawing the power back to central government. What I found interesting last week is obviously with the move to make Manchester self-determining and giving them power to make their social care policies, I was sitting thinking: Manchester is 46 miles down the road. How can you have one policy there where you recognise and Mr Osborne was there waxing lyrical about, you know, 'it's really important that local communities grasp this' and reverse it in the next breath. It doesn't make sense to me.

(Photo: Public Inquiry, Blackpool; February 2016)

This research has found that the residents do not believe that when decisions about shale gas exploration will be made at the central level they will be based on evidence. There is a sense that the government has already predetermined its decisions in this regard and that the Inspector's report, all evidence, representations and research gathered during the planning process may be insignificant and superfluous. In the eyes of the local residents, the evident contradictions between the former government's declarations and actions have demonstrated a number of political inadequacies, from a lack of joined-up thinking and dishonesty to hypocrisy. The inconsistency and perceived hollowing-out of legislation that could foster the role of local decision-making in relation to shale gas has contributed to feelings that the government is pro-actively and continuously trying to tip the balance of power in favour of non-local interests and to take the local decision further, out of democratic reach. This has further amplified the negative impact of shale gas development on people's understanding of and disillusionment with democracy in the UK.

6.3 Institutions

This research has found that the relationship between democracy and how institutions work has been severed in the perceptions of the local residents and some councillors. Most importantly, they feel that the government's stance on shale gas undermines the validity of the local democratic process. As one local resident put it: 'it goes to the heart of democracy. It goes to the heart of whether there is any point in having a planning committee at all in Lancashire if in the end it's going to be overruled'.

At all local levels, councillors have described the limiting pressures they have experienced as part of the planning process in order to consider only certain aspects or impacts of shale gas activities and to list only those reasons for refusal that were considered to be most defensible at a possible appeal. A local borough councillor described it thus:

> I felt like somebody had the brakes on and they were resisting putting too much detail. It was almost as if everybody knew that we were wasting our time because the government wants it.

This pressure testifies to the widespread sense of an imbalance of power whereby local institutions are unable to match the gas company's financial resources in case they are forced to bear any additional costs. That has meant that much of the financial burden has fallen on the local groups, which have employed experts and legal advisers to help them present and substantiate their case. This is how a local county councillor accounted for the situation:

> If you think about it, what we would have heard if those groups hadn't been there saying what they said; if they hadn't invested in the barristers, the seismologist, the experts that gave evidence, then we wouldn't have had that evidence. We wouldn't have that balance. Obviously, no-one was going looking for it, were they? That's another question. I think a further question is, if it's going to be taken out of our hands anyway, why not be honest and say that look, the democratic process isn't going to follow. They probably wouldn't do that for political reasons but I hope it is exposed for what it actually is because I cannot come up with any other explanation for what's being said.

This quote highlights an important impact that the residents' active engagement has had on the planning process. The evidence presented by local groups concerned about the effects of fracking in the area has provided a corrective balance to information about the impacts of shale gas exploration brought forward by the gas company. The councillor pointed out that the county officers responsible for preparing the planning recommendations did not actively seek that information, relying to a significant extent on data and analysis provided to the planning process by the gas company. The information presented by the local residents' groups influenced the amount and quality of evidence that the LCC could take into account to make a decision. Hence the local residents also inadvertently opened the planning process up to a more diverse set of perspectives and aspects that could be considered in relation to the shale gas debate.

The residents' experiences with the planning officers at the LCC seem to also have made them more vigilant and distrustful of regulatory agencies. Local officers, especially at the LCC, as well as regulators from the HSE and EA are perceived to be influenced by the government and/or the company and unable to make impartial decisions, as was aptly summarised by a local resident who said at the Public Inquiry in Blackpool: 'The real issue is that we cannot trust the EA to do a proper job of regulation when the government has already indicated the outcome it wants to achieve'.

The lack of trust in the regulatory bodies is amplified by the ways in which these agencies are perceived to have failed at preventing such recent events as a local cryptosporidium outbreak in 2015 and the two earthquakes that were connected to shale gas activities in 2011.

Serious concerns have been raised about the impartiality of the LCC officers' review process. In many residents' perceptions, the Planning Officer was acting as if he were a 'salesman' for the shale gas industry and many times declined to meet with residents while at the same time meeting with Cuadrilla. With regards to the two most recent applications for PNR and Roseacre,

the local residents, councillors as well as some observers were forceful in their opinions that the Planning Officer's report, which should assist councillors in making a planning decision, was 'not just deeply flawed but demonstrably biased in favour of the applicant' (Short, 2015). A discourse analysis of the report shows that the emphasis on certain evidence and aspects of shale gas applications as well as the choice of politically loaded terms, such as 'environmental extremist activities', raises doubts as to the objectivity of the reports.

The reasons for this perceived bias are not entirely clear. Some of it may be due to the officers' initial lack of knowledge concerning fracking. Shale gas developments might have been outside of the officers' professional expertise and they could have been particularly prone to relying primarily on information that was submitted to the council together with the planning applications. Moreover, since the 1980s, research on public sector decision-making has revealed how decision-makers may tend to systematically simplify the range of potential alternatives and be biased towards the status quo (Lindblom, 1959). They may also be particularly prone to take risks when they assume losses and fixate on perceived but non-existent relations between wins, losses and their decisions (Ryan, Hebdon, & Dafoe, 2014). As a result of changes in public administration that took place across Europe beginning in the late 1980s, public officials have become immersed in perspectives that professed the efficiency of market solutions and an orientation towards the economic aspects of projects. Decision-making has become more data- and evidence-driven. It has also faced pressures to offer more and better services with fewer resources. Research has found that these attitudes tend to promote conformity, preoccupation with self-preservation and stifle experimentation (Dubnick & Frederickson, 2015). In contrast to these factors, which might have influenced the officers' opinions and actions, some county councillors reaffirmed that their perception of what is a valid reason to refuse an application is broader than that of the planning officer, as they also needed to take into consideration the democratic aspects of the process, i.e. the need to try and equalise the balance of power between different stakeholders, which cannot be resolved through technical and evidence-based decision-making.

This research has found that the actions of certain officers at the LCC have also been critically assessed in that they could potentially influence the final decisions about shale gas activities reached by the Development Control Committee. From the accounts of residents who participated in the planning process as well as some councillors, it would appear that there was bullying. Many participants and observers felt that undue pressure was put on the councillors to water down their grounds for objecting to the shale gas applications on the basis that the more robust set of grounds that was initially proposed was unsustainable on possible appeal. Hence, as they were advised, objecting on those grounds could be potentially unlawful and expose the Council to high appeal costs. As one councillor put it during the discussion: 'the fact is that the Council or the members of the Committee have been given legal advice which has tied the members' hands, I'm afraid. And basically made it a waste of time for any of us being here for the last few days'. However, once the advice that the councillors originally received was put in writing and made public and alternative legal advice was sought, they did not put the councillors' options in quite as stark terms. The media in Australia have also reported that pressure has been put on public servants over the approval of gas project assessments (McCarthy, 2013).

In the preparation for the appeal in Blackpool, a statement of common ground was supposed to be prepared in cooperation between the gas company and the LCC. As some councillors recall, the draft statement that was presented to them listed as areas of agreement those aspects of shale gas activities that the councillors could not formally object to because of the limitations of the planning process. Nevertheless, they did believe that those aspects of shale gas developments could adversely impact the local communities. This potential misunderstanding that could have been created about the possible sources of harm is consistent with research that shows how citizens' concerns are sometimes misrepresented by state agencies in formal

(Photo: Preston New Road)

documentation (Opsal & O'Connor Shelley, 2014).

The experience of refusing the shale gas applications despite the officers' recommendations has empowered local councillors and made them less dependent on the officers' conclusions, which, as one member of the Development Control Committee at the LCC admitted, has made the process more democratic. Some residents, however, expressed their disappointment in that they were permitted to present their point of view to the councillors but there was no room for a discussion between the councillors and members of the public.

The residents have followed the rules of the planning process but strongly believe that the scientific risk assessment as well as technical and planning aspects that were taken into consideration when determining the fracking applications were insufficient grounds for making good decisions. Scholars from a range of different scientific disciplines have also pointed out that the technical understandings of feasibility should be supplemented by a social understanding of risk and that local communities should take part in the process that also involves a broader deliberation of the possible alternatives, innovation, social desirability and democratic legitimacy of the proposed resource extraction projects (Burall, 2016; Stirling in: Government Office for Science, 2014; Willow & Wylie, 2014).

The NPPF (Department for Communities and Local Government, 2012) also seems to have established a broader set of considerations that should be taken into account in planning. It states that the three core and interconnected dimensions to sustainable development are economic, social and environmental. It goes on to state that these dimensions correspond to the three roles of the planning system. However, some local residents have pointed out that the planning reports on the basis of which the fracking decisions at the LCC were to be determined were deficient in that they only addressed the environmental and economic dimensions of shale gas exploration, thus failing to take into account the social impacts of fracking. As one resident put it during a hearing in Blackpool: 'This is the elephant in the room' and added: 'in recent years, planning has tended to exclude rather than include people and communities… [The social impacts of fracking] should have been given the same consideration within the social element of the NPPF jointly and simultaneously with the economic and environmental considerations, especially within the planning reports'. One of the findings of this research is that the local residents feel strongly that this lack of attention to the social role of planning has

confined the process to being simply a means of delivering shale gas development irrespective of local concerns. The officers' pressure to effectively render long-term sustainability and social health and well-being subordinate to economic development and the scientific measures of risk has been perceived as the effect of capture by business or the government's interests.

It is also believed that the attempt to box in local groups by defining what constitutes a reasonable concern and a relevant objection to fracking has limited the robustness of their case and has aimed at ensuring that the objections present as little threat or constraint to shale gas developments as possible. However, this may also be connected to the structural and policy factors defining the scope of the grounds for the planning objections. Research has found that, as a response to highly uncertain impacts (such as in the case of fracking), policy makers tend to underestimate the risks and privilege single point estimates to more accurate but also more complex ranges of possibility (Stern, 1991), not to mention qualitative studies of the impacts. The findings of this research unequivocally confirm the view that the lack of consideration for the social impacts of fracking may significantly influence the outcomes of planning and political decision-making regarding the exploitation of shale gas in Lancashire and the UK, thus disadvantaging the local communities.

Despite the initial distrust in the planning process for the consideration of applications related to shale gas exploration (Ben Cave Associates Ltd., 2014a) local residents have learned how to participate in it in an active role. At the time of this research (2015-2016), the prevailing opinion was that if not interfered from the central level, the process is capable of delivering impartial and just outcomes.

Cuadrilla's activities in Lancashire have influenced the workings of some parish and borough councils and have led to a possible entanglement of interests because some members have, either directly or by virtue of their membership in a local group, received donations from the company. These interests had to be declared at meetings when councils were discussing shale gas and meant that some councillors withdrew from those discussions. In the opinions of the residents, however, donations accepted by councillors have not automatically influenced their views about fracking.

6.4 Responsiveness and integrity of political representatives

Throughout the course of this research, the local residents often assessed their local and national political representatives through the lens of how they have responded to their concerns about shale gas development. The two most pervasive themes that emerged concerned the politicians' perceived integrity and responsiveness, which have been largely negatively evaluated, though some local councillors' work has been assessed in a positive way. The general opinion is also that residents have to work with their local councillors.

In the residents' accounts, members of government as well as local MPs seemed to initially lack basic knowledge about shale gas exploration and extraction, which amplified the residents' lack of trust in the politicians as well as signified to them how their representatives were 'out of touch with reality'. Because of their position in the Parliament, some local MPs have been reluctant to engage in the shale gas debate because it is seen as controversial, and has left communities feeling disenfranchised. The residents' requests for a local MP to take part and speak at the Public Inquiry in Blackpool have not been answered. Local community members have complained about the unresponsiveness of their representatives, which does not always mean that their letters remain unanswered but rather that the replies they do receive are perceived as meaningless, i.e. failing to answer the questions asked or to respond thoughtfully to the concerns raised. There is a very widespread sense in the local communities that their political representatives are not necessarily representing them. Politicians in general are perceived to follow their party line instead of thinking independently.

Furthermore, local residents expressed their disappointment when their representatives did

not take a clear position either for or against fracking and considered the indeterminate view to be 'meaningless' and showing a politician's lack of interest in or knowledge about the process. Local community members have also been dissatisfied with the opinions of some politicians that, as long as it is safe, fracking should be allowed in the UK. They see this view as ignorant because the main thrust of the residents' activity has been to educate and disseminate research results and information showing the different risks of shale gas

(Photo: Roseacre Road, Wharles)

exploration and extraction processes. There has also been some uncertainty as to the actual power the MPs have and whether they 'too feel that what they say won't matter'.

Even when the local MPs seem to become more involved in the shale gas issue, most of their statements are seen as declarative only and aimed at obtaining electoral support. One MP has also been perceived to unjustifiably take credit for the closing down of one of the fracking sites. Although a local MP stated that he thought the final decision about fracking in Lancashire should be made at the local level, the residents do not believe that local MPs could be effective in bringing their concerns to bear on the Parliament's or government's decisions regarding shale gas. The residents' engagement in the planning process has transformed their view of their political representatives, who are now being perceived by many as arrogant and interested in power, not democracy.

The integrity of the political representatives at all levels has also been questioned by the local residents. This has ranged from borough councillors who might have accepted money from the gas company for some minor activities on their land and failed to disclose this during the council's meetings to the highest levels of government.

Two leaked letters in particular seem to have undermined the perceived integrity of the former Chancellor of the Exchequer (George Osborne) and the former Secretaries of State for Energy and Climate Change (Amber Rudd), Environment, Food and Rural Affairs (Liz Truss) as well as Communities and Local Government (Greg Clark). The first letter, written by George Osborne in September 2014 and revealed in January 2015, urges his cabinet colleagues to make rapid progress in the shale gas issue their personal priority as well as to respond to a few 'asks' from Cuadrilla. In the second letter, written shortly after the fracking applications were

refused in Lancashire in June 2015, the three Secretaries of State suggest that the shale gas projects should be classified as a 'nationally significant infrastructure' and outline the general plan for making shale gas production a maturing industry within ten years. In the opinions of the residents, these letters confirmed their concern that decisions regarding fracking were already predetermined and would be made at the central level if the outcomes of the planning process locally were unsatisfactory to the government. Especially in the first letter, the Chancellor was perceived as taking on the role of an active advocate of the industry, hence his integrity as a democratic representative was severely undermined in the local communities.

Once the two most recent fracking applications in Lancashire moved to the appeal stage, some politicians welcomed Greg Clark's announcement that it would not be the Planning Inspector but he who would ultimately make the decision. In their view, this was more democratic (i.e. in the public interest) than letting an unelected official determine the applications. However, the local residents would have preferred that an independent Planning Inspector decide because it was believed that she would have to look at the evidence only and could not predetermine her decision. The government, on the other hand, was not bound by such rules. The residents' fears about the impartiality and sincerity of the government's concerns regarding the public interest seem to be echoed in previous research, which has demonstrated that democratic institutions' appeal to the 'public interest' can be deeply embedded in imbalances of power and in the protection of special interests. Hence, despite the language of democracy, this can lead to environmental degradation and social distortion (Flyvbjerg, 1998; Gibson, 2005).

This dissatisfaction with the performance of local and national politicians as well as concern about their future stance on shale gas has led many residents to stand in national and local elections with good result. A few of them have been elected (or re-elected) to the local councils.

6.5 Disempowerment and a structural shift in democracy

This research has found that the direct confrontation between the residents and the gas company has left many people feeling profoundly disempowered, lacking a sense that there is a choice and disillusioned about democracy. This finding is consistent with other research reports on unconventional fuel extraction in the UK as well as in the US (Hilson, 2015; Willow, 2014; Willow et al., 2014). The local residents' view of democracy has changed dramatically. The majority perceive democracy in the UK as a façade, a superficial quality of a governance model that politicians pay lip service to but which, in reality, is based on the 'power of lobbyists and industries against the small people'. This power is seen to be eroding democracy and fragmenting communities and social groups. This disillusionment with the workings of democracy and the profound feeling of disempowerment has contributed to the general trend of declining electoral turnout in many Western societies. What is significant in this particular case is that this change happened so quickly (over a period of just two years), it took place in a historically conservative area and it was a direct effect of the residents' involvement in the shale gas issue.

The impacts of how shale gas developments transformed people's beliefs seems to have been particularly hard for the elderly members of the local communities who:

> had trusted our government and they always said the same thing: "they wouldn't do it if it could harm us." This is a generation that lived through the war, very stoic, do not complain but the same people are saying how can they do it if they know that it's harmed people in America or Australia? If they know that it shouldn't be sited near people, how can they do it? So it's a bit like a rat in a trap – they go round and round and round without getting any answers. And I think that's particularly harmful.

Throughout the planning process, local residents opposed to fracking reiterated their position that they did not agree or authorise shale gas development in their area as well as

in the UK. They drew on the notions of informed consent and social licence to highlight their democratic and moral right to have a say which is also being increasingly recognised by commercial entities. Local communities in Lancashire are concerned with questions of control over their own destinies. Many people had a clear vision of the ways in which they wanted to spend their retirement, develop their businesses or raise their children. There is a clear belief in the area that shale gas development at scale would most certainly interfere with those plans and hence would put them at risk. Feelings of personal and democratic violation caused by an uninvited and unwanted development are very intense in the area. The following quote from an individual presentation at a hearing in Blackpool is illustrative of this feeling:

> I too respectfully request Madam Inspector that you convey these comments to the Secretary of State by reflecting the strength of feeling of the people and communities in Lancashire that we won't become guinea pigs for this unwanted industry; we will not be persuaded by misinformation, disinformation or dodgy PR practices and certainly not with free pencils and carrier bags bearing the, now hated, logo of Cuadrilla. Whatever the outcome of these proceedings, we will not be browbeaten by the central authority. Might is not right. We are Lancashire. [laud cheering and applause]

This research has found that the residents' concerns with control over the fundamental aspects of their immediate environment and communities have been expressed via many different channels. Just as with other resource developments and environmental campaigns in the past (Ballard & Banks, 2003; Rootes, 2013), residents often appeal to wider audiences by using such potent notions as democracy, climate change and human rights to build their narratives. The aim is not only to universalise a local struggle but also to highlight that the communities have learned that their opposition cannot be reduced to prioritising technical, planning or even environmental aspects of shale gas development. The perceived barriers to engagement, the government's unresponsiveness as well as the imbalance of power between the different stakeholders in the planning process are significant experiences, the effects of which can reverberate in many different ways.

The residents' appeal to democracy precludes the normalisation of loss of agency, and the people's engagement in anti-fracking campaigns affirms the communities' right to resist unwanted developments as well as to participate in an informed debate about fundamental energy issues. The disempowerment that they experience stems from inequalities between residents, on the one hand, and the industry and government on the other. There is a clear sense among the local residents that these imbalances of power and resources are unfair, especially if the premise that the planning procedure is impartial is taken for granted. The local residents feel that they have not been listened to during Cuadrilla's public consultation events and they lack confidence in the government and its ability to make decisions in the face of perceived vested interests. Especially damaging to the people's confidence in the government has been its decision to publish a heavily redacted version of an internal report on the local economy impacts of fracking that, as was revealed after a successful Freedom of Information request, contained information about the possible adverse impacts of shale gas development. Similarly, there is a sense that as of June 2016 the government seemed to be withholding the publication of a report by the Committee on Climate Change which was expected to include information that could be potentially unfavourable to the promotion of fracking in the UK (Harvey, 2016). This possible secrecy is perceived as suspicious and hypocritical by members of the local communities as well as by the broader anti-fracking movement and may make them more sceptical about and resistant to the government's policies and narratives in the future.

Other research has also confirmed that people are likely to resist and distrust a new technology if they perceive institutions to be using mechanisms and procedures cynically and instrumentally to engender obedience rather than engage in a dialogue (Wynne, 2006). A local resident from Singleton talking about her experience with the planning process can serve

as an example of this:

It has changed my whole attitude. I actually did seriously believe that I lived in a democracy and I don't actually anymore and I wouldn't trust anybody, I wouldn't trust councillors or anybody any more... [That change happened] through an eye-opening moment... They [local councillors] seem to be more interested in the protocol of the meeting rather than getting to grips with and being aware of what people were actually trying say. [They would be] worried about security. They had the police outside the meeting which was in [name of local café] and the police kept turning up. There were a lot of people there but we are not talking about rowdy anarchists. We're talking about local people taking an opportunity to actually speak... I did actually believe that the whole planning process was there to protect local people and that local people, if you made representations, that you would be listened to and be heard. I wasn't sort of aware that beyond that there was a wider political agenda. Now I realise that I was quite naive about politics altogether. [laughs].

On the other hand, this research has shown that many local parish, borough and county councillors have also expressed feelings of powerlessness, which has been a cause of distress for them and has made them question their work as local representatives. In a way similar to the residents, some of them have perceived the state as protecting the oil and gas companies at the expense of the local people, who are being ignored. Uncertainty about the consequences of shale gas developments (both positive and negative) features very strongly in the councillors' accounts and is entangled with the hope that if the decision about the fracking applications turns out to be in favour of the company, members of the local councils will at least be able to say that they did everything they could at the local level, as this county councillor articulated it:

Whatever happens in February [when Public Inquiry in Blackpool commenced], I think the decision will be to go ahead. I think local people initially feel let down by the national government. I hope that we've done enough locally to say we did hear you, we did what we can. Let see what happens. This is two applications but what we don't know is if more will flood in before [these ones] are followed up. If there was enough information and evidence to say that look, we've answered all your fears, there is nothing to worry about. But one of the problems is that we don't know for many years to come and one of the worries is finishing off and leaving the site. How it's left and what the future is for the area afterwards. It's an unknown and that's a problem because if it was a little bit clearer that actually everything is gonna be fine and Lancashire will benefit enormously. I'm actually not sure that that would happen.

The uncertainty about what is going to happen and what the impacts of fracking are going to be is contributing to perceptions of disempowerment and vulnerability. One facet of this uncertainty is the perception that the government is changing the law in order to facilitate the shale gas industry. The local residents are not sure that the rights and rules they now take for granted will be there to protect them in the future. They are, for example, aware of the changes introduced by the Infrastructure Act 2015. The Act changed trespass laws to allow companies to drill below 300 meters without the need to obtain a landowner's consent. The Act also authorises companies to leave any substance in the boreholes as well as provides the legal framework for the creation of nationally significant infrastructure projects (NSIPs) which do not require local consent.

Other new and proposed legislation is closely monitored in the local communities and interpreted in relation to the ways in which it could potentially facilitate or hinder fracking in the UK. Since the rationale for changing the law is not always clear, ambiguity and perceived secrecy or conspiracy further undermine trust in the company and the UK government. Ethnographic research on environmental disasters has confirmed the disempowering effects of secrecy and uncertainty (Button in Willow, 2014).

The residents do not agree that a larger scale of the possible benefits (associated with the designation of an NSIP) necessarily trumps local concerns. In fact, the local residents strongly believe that if fracking is approved to take place in Lancashire, where the depth of feeling against those plans has been demonstrated at many levels, it would create a precedent and lead to shale gas development at scale in Lancashire and in the entire UK (Roseacre Awareness Group, n.d.). The sense of powerlessness and vulnerability is amplified for those residents by the perception that if fracking were approved, due to declining property values in the area they would neither be able to leave nor would they want to stay.

Local communities view the geographical factor as important in determining the siting of shale gas projects. The perceived governmental push for the creation of a 'Northern Powerhouse' as well as the statements of some politicians (D. Carrington, 2013) are seen as discriminatory towards the North of England, which is to bear the majority of the adverse effects of energy developments for the benefit of the 'South' and the London-centric political elite.

In anthropological research, disempowerment and vulnerability have routinely been reported in socio-politically disadvantaged communities that are being subjected to environmental and health hazards as a consequence of social and economic injustice (Ballard & Banks, 2003; Willow, 2014). Researchers have been much less accustomed to seeing disempowerment in the typically middle- and upper middle-classes, and in relatively affluent areas such as those proposed for shale gas development in Lancashire. Environmental degradation has usually been removed from the beneficiaries of industrial developments and confined to areas where the local people are bearing the disproportionate share of the burden and which are politically or socially marginal to the centres of power. In the ethnographic research, environmental degradation, pollution and other adverse effects of a development can be interpreted as a direct reflection of the social relationship (Kirsch, 2014) between the citizens and the political elites. If it is the middle classes that are living in areas that can potentially face environmental degradation, this suggests a structural shift in the workings of democracy in that the political elites no longer seem to perceive that part of their electorate as a cornerstone of their politics or electoral success.

This research has found that the residents' experiences with their political institutions and representatives, loss of subsidiarity as well as perceptions of disempowerment and vulnerability have 'opened their eyes to the side of democracy that was previously unseen', as one resident put it during the Public Inquiry in Blackpool. These experiences have transformed people's relationship with democracy in that they feel very intensely that 'their' state and government are no longer working for them. This finding is consistent with recent social movement research that is exploring widespread disillusionment with representative politics and the changing nature of popular democratic demands (della Porta, 2013; Graeber, 2013; Ortiz, Burke, Berrada, & Cortés, 2013; Sitrin & Azzellini, 2014; Szolucha, 2016).

6.6 Effects of grassroots engagement

Grassroots engagement in the shale gas debate in Lancashire has had a number of significant impacts on the democratic debate and decision-making as well as public awareness at the local and national scale. The fact that a debate on fracking has taken place is seen as an important achievement of the local communities:

> When the shale gas industry first came here, they thought that Britain would be a breeze, [that] Brits are apathetic. 'We'll be in there, we'll be in production. No one will ever know'. That was their plan. There was never supposed to be a debate, never supposed to be a debate about any of it. They were shaken by how quickly we got organised...

Together with other groups and campaigns, the local residents have played a central role in mobilising citizens locally as well as nationally to participate in the public debate on shale gas development in Lancashire and the UK. They have organised many outreach and networking meetings as well as solidarity actions, and the Frack Free Lancashire campaign has become an

important reference point for other similar groups across the country. They have informed the public about shale gas and raised questions about whether there is a need for unconventional fuel extraction and if fracking constitutes a progressive and safe path to pursue. There have been a number of direct actions, such as the Nanas' camp at the PNR site in August 2014 or the rig occupation at the site in Banks, West Lancashire. The aim of the former was to inform the local residents about the planning application as well as the precise location of the potential fracking site. One local resident described the impact that the rig occupation had on raising public awareness:

> if it hadn't been for them [two individuals who climbed up the rig], [fracking] wouldn't have been brought to the public eye. You just couldn't do enough to bring it to the public eye. The people are just so busy to pay their way and this is what the government wants. I'm sorry to get political but this is what they want. They want them to just scurry like little mice or ants, earning the living, paying the mortgage, paying this, paying that and don't take the notice of what's actually going on cause I was one of them till it actually impacted on us and our family.

Through social media, local residents have actively promoted information about shale gas exploration and extraction processes as well as have contributed to the mainstream media coverage of the issue, which helped expose many people in the UK to a wide range of perspectives on and dimensions of the problem. The DECC statistics show that the more people know about fracking, the less likely they are to support it (Department of Energy and Climate Change, 2016). Hence the declining trend in support for fracking can be attributed to growing awareness and knowledge of the process in the UK.

Research on the role of civil society organisations in public deliberation about contentious matters shows that disagreement fosters reflexivity and can inform a more robust decision (Dodge, 2015). Conversely, limited debate manufactures public consent that can be converted into legislation which then favours corporate profit over the citizens' well-being (Hudgins & Poole, 2014). Grassroots engagement in the shale gas issue in Lancashire has had a democratising impact on decision-making in that they exercised their right to full democratic participation in the local planning process even though the mechanism did not allow to address issues of environmental injustice or unequal power relationships between different stakeholders. Local county councillors admit that the decisions refusing the fracking applications could have been different had the communities not mobilised their time and resources to present their evidence and views to the LCC. This is how a local resident articulates her views about the impact that the communities have had on the planning process:

(Photo: Residents interviewed by BBC, Preston; June 2015)

> I have to be honest and say, as I said all along, that I have never been a campaigner. I have always believed that there were people who

were suited to be councillors... and they have always, in my view, have done that job, fulfilled that role and I've never interfered with it. I've never had to contact either a councillor or an MP until this time. Now I know all of them: Fylde Borough Council, Lancashire County Council, the [Development Control] Committee, you name it, I know them. So basically, I've understood that these people do work for us but without you actually invoking their help and applying a certain amount of pressure for them to listen and understand and get up to speed, there are lots of things that they are involved with and this is just one of them. It's struck me that perhaps if the local community didn't do this, that this could get lost and fall through the cracks. So there, I've gone from a kind of belief that they would take care of that, my current belief is that the community is doing this job with the assistance of the local councils. And, to be fair, there's been some amazing councillors. I can't pay enough homage to people like [name] who had the courage... and stood up and been counted because other people have been so busy trying to sit on a fence or not take a side.

The residents have also written many letters and handed in petitions to political representatives at the central level. In the general interest of democratic transparency, they submitted many Freedom of Information requests to different institutions and bodies. Although they felt locked out of the political arena at the central level, they have clearly applied social pressure on the decision-makers through conventional means as well as certain forms of 'disruptive power' (Piven, 2008).

Popular demands for more democratic and participatory politics in natural resources and energy have been recognised by many scholars as essential for systemic and complex climate change action (Burall, 2016; 'Climate change action needs widespread democratic change', 2016). These views seem to echo those at the grassroots level, where technical and planning expertise as well as the government's actions are perceived to be insufficient to tackle questions regarding resource extraction which, in the public psyche, are interrelated with much broader issues such as climate, democracy and the future of energy. The democratising effect of grassroots engagement comes from the ways in which people create new and democratically run groups where those questions can be debated, producing a demand to open up existing democratic institutions and spaces for those kinds of organising structures, arguments and concerns that are expressed at the local level. These ways of grassroots organising are largely based on small, autonomous groups and horizontal relationships in which members have the same amount of decision-making power. This is considered to be a structure that fosters community spirit and is s trategic in that 'there is no hierarchy that industry and police can go after'. Researchers have also already begun investigating different forms of deliberation and collective action, such as 'mini-publics' which create responses that are appropriate for the scale and intractability of climate change (Kahane, 2016; Ward, 2016).

Research has also found that sometimes local concerns provide an important check on the abuses of authorities by stopping or delaying ill-conceived or expensive projects (McAvoy, 1998). If significant amounts of shale gas are extracted and sold in the UK, this could discourage investment in renewable energy solutions and lock the country in a particular type of fossil-based energy production. In anticipation of shale gas extraction at scale and in direct contrast to its declarations made at the COP21 in Paris, the government is already perceived to be drastically cutting support for renewables. Questions about the possibility of a 'carbon bubble', not to mention the consequences of climate change, abound in scientific and public discussions. Hence, in the short- and long-term the social and political impact of the critical scrutiny of shale gas developments by the local communities may be profound.

Grassroots insistence on the creation of more comprehensive and consistent energy policies at the central level could have an effect of narrowing the power gap between different stakeholders. A policy that would be consistent with UK's international commitments and look at energy and resource extraction in a systemic way could help distribute the costs of addressing energy issues widely, while the decision to pursue shale gas exploration and extraction would concentrate those costs first

on the communities living in the vicinity of the fracking sites.

In the long run, local groups' engagement may also contribute to the decentralisation of governance in the areas of resource extraction and energy. Research shows that it would not be the first time where what appeared to be purely local disputes about the siting of energy developments have become public arenas for wider contestation about the direction of the energy policy (Cowell, 2016; Owens & Cowell, 2011; Sovacool & Cooper, 2013). The Public Inquiry hearings in Blackpool were livestreamed on the Internet and widely reported in the media. They attracted a considerable degree of local and national interest and many residents spoke out during the proceedings. The Inquiry in Blackpool, therefore, provided a public arena where some of the core policy assumptions about energy and climate change could be critically scrutinised and questioned by officials, experts, business representatives and citizens. Earlier analyses show how the national critique of policies and local objections to particular projects were mutually reinforced during public inquiries, and how this has influenced popular opinion and understanding of the issues under discussion, thus making certain criticisms and arguments seem more or less thinkable (Cowell & Owens, 2006).

Overall, the residents' assessment of the Inquiry is that is has fostered their representation of the shale gas developments in Fylde as well as the fracking process more generally. They feel that the Inquiry helped them at least to some degree to contest the social and environmental acceptability of shale gas, simultaneously raising questions about the imbalance of powers, environmental values, climate change and subsidiarity. Some scholars have found that this feature of public inquiries and the planning process can contribute to alternative framings of a public policy that has lower environmental impacts. The difficulties of negotiating the perceived delays caused by legal challenges mounted by local communities, civil disobedience, protest and direct action, coupled with tightening international environmental commitments, have helped refine arguments for the alternatives (Cowell, 2013; Owens & Cowell, 2011).

In the UK's history, some public inquiries, such as regarding the Sizewell B in the 1980s, were deliberately extended to issues of energy policy and discussed whether there was a 'need' for new nuclear developments (Marshall & Cowell, 2016). According to recent research concerning the planning process in the UK, even narrowly defined 'material' considerations and technical procedures have not been able to contain arguments and evidence that would be more critical of the underlying policy assumptions. These arguments have been based on a more critical reading of sustainability. The notion is central in the national planning framework and has contributed to the significant effect of politicisation of policy through planning:

> Rather than seeing concepts of sustainable development deflect conflict into consensus around market-led growth we often see, in planning, long-standing conflicts over the environmental acceptability of development re-emerge as struggles around what sustainability should mean, in which hard choices cannot be avoided…
>
> [O]perationalizing sustainability inevitably raises fundamental questions about need, demand, justice and the acceptability of environmental impacts, which have repercussions for wider political communities, and for which the best answers may not equate to the aggregate consequences of local determinations. (Cowell, 2013, pp. 30, 34)

The effect of the Inquiry on the local communities was that it created room for public engagement and investigation of evidence about shale gas, thus decentralising and politicising a wide range of broader issues and policies. There is a possibility that through their mobilisations, local groups will also try to bring the results of the Inquiry to bear on national decisions and plans, thus significantly amplifying the local impacts of the hearings. Like similar groups in the past, they may use their experiences and networks to grow as a social movement, build their formal infrastructure and expand the movement's boundary (Szasz, 1994).

7

RELATIONSHIP of the COMMUNITIES with the GAS COMPANY

Throughout this research study, communities expressed deep distrust of the gas company. They also lacked confidence in the company's ability and willingness to conduct its activities in Lancashire in a safe and professional way. Residents have also contested the data and analysis presented by Cuadrilla. More research would be needed to describe and assess how the company views relationship-building with the local communities and how direct actions as well as the anti- and pro-fracking campaigns have influenced its activities in Lancashire.

7.1 Breaches and failures

Particularly damaging to the image of the company in Lancashire have been the perceived technical failures and planning breaches that have been committed. Out of Cuadrilla's four shale gas developments in Lancashire, residents and some county councillors believe that in two cases the company might have drilled beyond the 90-day limit and failed to restore the sites within the agreed deadline. Effective enforcement of the planning conditions seems to be lacking in this regard and residents as well as county councillors were not aware of any penalties that Cuadrilla might have has faced as a consequence.

- After some technical problems at two sites, it is also believed that the

company drilled a side-track to the wellbore that was not mentioned in the planning permissions.

- Residents are also of the opinion that Cuadrilla has failed to adequately protect wildlife during some of its operations.
- In one case, the company abandoned the site, announcing that this was because of 'technical constraints related to wintering birds' ('Anna's Road site, Westby', n.d.), but during the Public Inquiry in Blackpool Cuadrilla admitted that it had been due to sub-surface technical reasons.
- Most importantly, a report for the DECC (Green, Styles, & Baptie, 2012) attributed a series of earthquakes in spring 2011 to the shale gas activities at the site in Preese Hall. The two largest (out of about 50) seismic events took place on 1 April (magnitude 2.3M_L) and 27 May (1.5M_L). In the public perception, the company is seen to be solely responsible for those tremors.
- The press has also reported some difficulties with the disposal of flowback fluids from the Preese Hall site. Eventually, even though there was a licence to dispose of the fluids into the Manchester Ship Canal, this caused widespread bewilderment among the local residents.
- During the course of this research, it was confirmed that Cuadrilla's contractors might have trespassed on private land in order to carry out geological surveys in 2012.
- Cuadrilla took responsibility for arranging the livestreaming of the Public Inquiry hearings in Blackpool. However, many complaints were received about the quality of sound. For many days viewers reported that they were not able to hear the audio.

Residents have repeatedly referred to those perceived failures and breaches to justify their distrust of the company. Some have also suggested that they meant that Cuadrilla had a 100 percent failure rate in Lancashire. One resident recounted that when Cuadrilla's management were challenged about some of those failures, they were dismissive and arrogant and said that they had continued beyond the agreed time limits because 'nobody told us to stop'. In other accounts the residents described the company's attitude as characterised by a 'haphazard approach' as well as 'gross incompetence and total denial'.

(Photo: Preston, June 2015)

The fact that the gas company has not faced any major consequences as a result of the above failures and breaches contributes to the image of a company that ignores planning permissions and enjoys implicit impunity, which has exacerbated the distrust of the local residents and has a knock-on effect on their negative assessment of the regulatory agencies. However, the relationship between penalties and corporate behaviour may not be entirely straightforward; for example, research examining the effect of regulatory enforcement in the US on the level of toxic releases has found that penalties paid by the releasing companies are more likely to legitimate their

activities than to actually limit their environmental impacts (Stretesky, Long, & Lynch, 2013).

7.2 Company's public relations

The NPPF as well as local statements of community involvement underscore the value and benefits of early consultation and collaboration between applicants and communities. According to these frameworks, designs that are submitted as part of the planning applications should take into account the views of the community.

Cuadrilla has organised a number of events, employed tools and mechanisms that have been aimed at fulfilling its obligations with regard to public engagement and consultations and has taken part in a number of other public relations activities, a summary of which is presented below:

- in 2012 it prepared and distributed a geophysical survey newsletter and organised information days during which feedback forms were provided;
- in 2013 and 2014 public information days were held after the company had announced its intention to apply for planning permission for exploratory drilling and fracturing;
- information events were advertised in the local media;
- since 2013, Cuadrilla has been sending a regular newsletter, *The Fylde Explorer*, to approximately 10,000 households in the area;
- at various occasions Cuadrilla staff visited the properties closest to the drilling sites to speak with the local residents about the company's activities in Lancashire;
- consultation events and stakeholder workshops as well as drop-in exhibitions were organised;
- Community Liaison Groups were set up that comprised members of the local communities, councillors, business representatives, members of other stakeholder groups and Cuadrilla's representatives. The groups' aim was to provide continuous feedback on the planning applications and, possibly, site operations. They did not have any decision-making powers but could make recommendations to the company for consideration. The meetings of the groups were suspended around May 2015;
- community contact points, including a freephone community information line, e-mail and a website;
- the following have benefited from the company's donations etc.: the Young Engineers competition 2013, Elswick in Bloom, Elswick village hall, Weeton village hall fund, Layton Juniors Football Club, Fylde Rugby Club, Snows Heights Adventure Centre;
- as examples of Cuadrilla's commitment to Lancashire business, the company lists its work with firms such as Remsol (local consultancy) as well as the University of Central Lancashire and Lancaster University (Arup, 2014b).

The company has also emphasised that local communities are going to receive £100,000 community benefit payment per site (on some occasions it said the payment would be per well) as well as be paid 1 percent of the production revenues during the production phase. However, local residents are not convinced that the payment would necessarily directly benefit the communities as it could be administered as charity and any organisation might apply to it for funds. During the course of this research, many local residents have also raised concerns that these compensations and voluntary donations by the company are based on purely economic and corporatist logic and aimed primarily at convincing the communities to support shale gas exploration rather than to contribute to the development of the area. As one resident put it during the Inquiry hearings: 'Cuadrilla is not a philanthropic organisation keen on giving the local economies a boost. Eighty-five percent of it is owned by American and Australian consortium and the bottom line is the profit for its investors'. For some residents, the practice of providing financial support has amplified feelings of distrust

towards the company because it would have been unnecessary if the fracking process were indeed clean and safe. Residents have also expressed the view that these compensations were meant to overcome local resistance and could potentially constitute socially divisive conduct by the company.

A widely known tactic of extraction companies has been to offer 'cooperation agreements' (Pearson, 2013) and financial compensation in exchange for support. Some of these agreements have also been accompanied by privacy clauses, which means that some of the central stakeholders may be prevented from engaging with the residents' questions and concerns. The findings of this research suggest that such practices might have also taken place with regards to shale gas exploration in Lancashire.

Cuadrilla presents itself as a UK company that is based locally (Bamber Bridge close to Preston, Lancashire) and fracking as an old and tried technique by recalling that it was first used in Kansas, US in 1947 and has been used many times in the North Sea since. The experience of an onshore oil well at Wytch Farm in Dorset was drawn on by the company because horizontal drilling and fracking had been used there in the past and the development had not had an adverse impact on the environment as well as on the house prices in the area. The company also bought a gas-producing well at Elswick that wasdrilled and stimulated in the 1990s (Arup, 2014b). The well was also presented as 'the company's well', thus suggesting a track record in the area. This rhetoric about a local UK company seems to be strongly resisted by the residents as they point out that the company is owned by entities based in EU-blacklisted tax havens such as the Cayman Islands. Furthermore, Cuadrilla's emphasis on the reliability and long history of hydraulic fracturing is perceived as fundamentally misrepresenting the nature of the current methods of slick water, high-volume hydraulic fracturing. This is perceived as a dishonest effort to normalise the process and to underplay its potential adverse impacts, which has had the effect of further exacerbating the perceived lack of credibility on the part of the company. The health impact assessment documents prepared for the LCC have also pointed out that '[w]hen describing the potential impacts of the proposal in the ES, the term "not significant" is used repeatedly, to the extent of it being overused' (Ben Cave Associates Ltd., 2014a, p. 6).

This research has found that one of the reasons why the local residents have expressed no confidence in the company is that its discourse does not seem to be developing in any way to respond to the growing body of scientific and peer-reviewed studies about shale gas exploration and extraction. This is a cause for concern as well as frustration on the part of residents, as this quote clearly demonstrates:

> I went back to a public meeting and I left the building and it was one of the few times when I cried. Nothing changes for them [Cuadrilla]. They're still talking the walnut, you know, the radioactivity of a walnut and the products that you have under your sink. As if they are still talking to stupid people and I just looked around the room and there were still children [PR company] taking e-mail addresses that they would never reply to and it was just Groundhog Day. And I thought wow, in the last few years, our lives have changed, ripped and torn apart so much and you're just still here playing the same game that you played week in week out.

In the residents' view, this lack of change in the company's discourse testifies to the fact that the proponents of the industry are not able to confront new research that may be unfavourable to shale gas development or, as this local resident involved in the FFL, put it:

> North West Energy Task Force… are still using a five-year old rhetoric but we've done our research and we've kept up to date. They're still [using] the same information and they can't change it because if they do, that means that they were lying in the first place. They have to stick to their story, otherwise it's a game over.

The company has offered a number of site tours for the local representatives and residents in order to familiarise them with the operation of a shale gas project. Some have reported it as a very patronising experience where:

> we didn't learn much about fracking but we learnt that there was a machine there to make

sure that people were kept away and people were only fed a very little bit of information.

Other residents recall that during their visits on a fracking site there were no drilling personnel in sight and, instead, the visitors were escorted by security guards.

Cuadrilla seems to foster the image of a company that is trying to reassure the local communities and authorities by announcing, for example, that it will undertake EIAs for all of its planning applications regardless of whether they are required or not (Environmental Data Services, 2013). Throughout the course of this research, however, the local residents have strongly opposed this image and have expressed the view that the company's rhetoric has not matched its actions. This finding confirms earlier research on the discourses emerging in relation to the shale gas policy in the UK (Cotton, Rattle, & Van Alstine, 2014).

There is a strong popular perception that Cuadrilla 'would go about [fracking] the easiest and cheapest way unless somebody puts blocks in the way'. Another local resident's assessment of the company's efforts to portray itself as a 'good neighbour' is a good summary of the popular opinion on this matter:

I understand that they could argue that they are merely trying to be good neighbours. I think that you have to be bloody stupid to fall for that, honestly. I think it's all done on purpose what they are doing. I'm not sure how effective it is. If you put Cuadrilla on someone's rugby shirt, some people see the word and then they think 'yes, that's familiar' but is that what helps your argument? Most people I know are not taken in by them. But they have made some serious efforts. And there are various astroturf groups that have been set up like on Facebook like Blackpool Fracking for a Better Future or Backing Fracking… North West Energy Task Force… is a front for Westbourne Communications [public relations firm]. If you ask me if they are playing cleanly the democratic game, the answer is no, they're not. Would we expect them to? No, we wouldn't.

The gas company as well as other supporters of shale gas exploration and extraction in Lancashire and the UK have put considerable weight on the possible economic benefits of the developments, such as job creation and additional income for the industry supply chain. More research would be necessary to assess these claims, especially in the light of the varying forecasts regarding the possible number of jobs created by the exploitation of shale gas (compare, for example: Institute of Directors, 2013; Regeneris Consulting, 2011). The current research has shown that local residents opposed to fracking have strongly contested the dominance of the particular economic rationality behind these assertions. Many of them have implied that their attitude towards shale gas will not be influenced by the increasing potential benefits to the community or by trying to minimise the costs. Rather, they are opposed entirely to an attempt to characterise the situation in terms of a calculation between the costs and benefits. Hence they have resisted Cuadrilla's efforts to define local desires in a way that would parallel those of the company (Mercer et al., 2014).

In many of its documents which became a part of the planning process, Cuadrilla and the industry as a whole have actively constructed a local history and community economic identity that has tied it to the potential economic benefits of shale gas developments. Lancashire has been portrayed as a long-term host to various industries such as cotton and aerospace (similar arguments have been made in other parts of the North of England ('Lobbying guide for North Yorkshire', n.d.)). The company has drawn on the statistics of intense deprivation of several spots in the area and has heavily relied on the popular perception of the economic and social problems in Blackpool. At the same time, residents have pointed out that Cuadrilla has been particularly successful in securing the support of some of the most well-off farmers. Furthermore, they have expressed their outrage at the fact that Cuadrilla has applied for an award of costs against the LCC in a situation where it is widely known that the Lancashire County Council is struggling financially and has been closing down libraries and cutting bus services. In this context, the local residents have resisted the company's efforts to portray itself as an advocate of those most in need of economic development in the area. Other research also confirms that discourse on the 'future prosperity' of rural

regions in economic decline has been pervasive in arguments employed in favour of resource extraction (de Rijke, 2013b; Mercer et al., 2014).

Analytically, the company's promotional efforts are a part of a framing process that:

> involves the social construction and communication of reality and is inevitably partial. Just like a picture frame or camera lens, framing is about how people see and represent an issue like fracking; like a frame or lens, it is also a strategic choice about which aspects of an issue to focus on and which to exclude. (Hilson, 2015, p. 179)

The 'economic benefits frame' draws attention to job creation and local economic incentives (Hilson, 2015). This research has found that in local debates this frame has been subsumed by other frames that have focused on issues of climate change, health and the communities' well-being. The credibility of the economic frame was severely undermined by the results of the cross-examination during hearings in Blackpool. Another contributing factor may be that people globally are more and more aware of the tactics of resource extraction companies, in particular those related to funding climate change sceptical organisations that raise doubts about and undermine support for rapid climate action (Barry, Hume, Ellis, & Curry, 2015).

7.3 Truthfulness and dealing with community concerns

The local residents in Lancashire have been dissatisfied with the way in which the gas company has been dealing with their concerns. The overwhelming opinion is that Cuadrilla has approached this as a public relations issue and has regarded the communities with contempt. The residents have also persistently doubted the accuracy of the data and evidence brought forward by the company. At a meeting of the Development Control Committee, one of the residents put it thus:

> They're playing a clever game. They call this temporary to underplay the impact especially if they know that the impact is awful. They have a pick and miss approach to evidence. They talk in averages, all clever stuff but not very truthful. I've also read what Cuadrilla has said about us and I wonder how they can use the language that they do.

Throughout this research, residents have been forceful in their opinions that the company has not been truthful with them about the impacts of shale gas developments, sometimes deliberately misleading them or ignoring evidence that was not in the company's favour. At the same time, the local groups' self-identity is based on a very strong ethos of truth and truthfulness, as this local resident and a member of the Lancashire Nanas declares:

> Sometimes you need to infuse truth and I've always said that the only weapon that we had was the little bucket of truth and a few questions and that's all that we can go out and play with.

The residents seem to deeply doubt the truthfulness of the company. This finding may explain why more information offered by the company does not seem sufficient to overcome some of the local concerns.

Cuadrilla's community engagement documents state that it has had a 'thorough and continuing programme of community engagement, both before operations commenced and during work' (Arup, 2014c, p. 26). Furthermore, the company asserts that the engagement activities have informed the planning applications. However, there is no clear evidence in the planning documents that this has been the case. Residents have also contested this view, feeling that they have been treated as mere receivers of information rather than serious consultees. This research has also found that the consultations fell short of the residents' expectations. A resident in Becconsall summarised the popular view about what was presented during the information events: 'If you heard the first presentations that they gave when they just started, it was just as if you haven't got a brain in your head and you couldn't go and research anything'. Another resident living in the vicinity of the PNR site recalled the first information event organised by Cuadrilla as that:

> there was a lot of very nice brochures and maps and that was our first introduction to it. A lot of people telling us about what was going to

go ahead within a few months and it was the case of not asking what our thoughts really were. It was a case of; 'this is what we intend to do and we would like your agreement but this is what we intend to do'.

Several residents have pointed out that the consultations organised by the company were 'carefully managed' and that there was a feeling that some of Cuadrilla's community events were poorly planned in that they were not aimed at generating the biggest possible turnout. Others viewed it as a 'box ticker', implying that the company was not truly interested in hearing and responding constructively to the residents' concerns.

Cuadrilla's written response to the citizens' concerns raised during the various consultation events reasserted that the company's plans were carefully considered and would not have an adverse impact on the communities (Arup, 2014c). It is difficult to find clear confirmation about how the company adjusted their plans in response to some of the concerns raised by the residents. This lack of evidence that the company has taken the concerns of the local residents into account in readjusting their plans has amplified feelings of being dismissed by the industry and has fostered the view that the consultations organised by Cuadrilla were not meaningful.

The residents have also doubted the effectiveness of the community liaison groups and there is a widespread belief that 'they do all this community liaison to make it sound like they are listening to us but it makes not a jot of difference what we said to them'. The local residents have reported that the groups might have also failed in their role as arenas for exchanging all of the important information about the projects; for example, the Roseacre group was not informed that surface arrays would be installed in 2014 and that area traffic measurements were taken. The company introduced security guards at the PNR site without discussing this or informing the local liaison group.

The residents have also experienced access issues with some of the meetings organised by Cuadrilla, as these were not accessible by public transport. There had been very little prior notice regarding some of the information events organised by the company (half a day) and when seismic survey activities took place in some areas.

The residents have expressed no confidence in the company's and industry's assertions that seem to view accidents and technical failures as highly unlikely and therefore not a significant consideration in the planning process. This is in contrast to the community's understanding of risk. The company's failure to consider the possibility of accidents has amplified the perceived level of risk.

7.4 Distrust

Throughout the course of this research, residents have expressed their distrust of the gas company. In addition to those described above, some of the most commonly mentioned factors that have amplified this feeling have been:

- uncertainty as to the future of Cuadrilla and the expectation that if it is successful in Lancashire it might be sold out to a larger company with an unknown environmental and social record; if problems occur the residents are concerned that the company may close and a different company is set up, diluting the responsibility for any potential impacts of shale gas developments;
- the company's perceived unwillingness to engage in a public debate with the residents; controlling the debate by not allowing certain members of the public to participate in Cuadrilla's events; pulling out of a joint media interview with the residents;
- the lack of transparency and the view that the company exerts undue and disproportionate influence on the government and legislation through family, social and professional connections;
- the effect on the company's image from its early applications which, by complying with the conditions set out in the legal framework by a tiny margin, sidestepped the requirement for an EIA

and made the industry look like they had something to hide (Cotton et al., 2014);
- awareness of the industry's deceptive or negligent practices as reported by the regulators, media, scholars and citizens in the US and Australia;
- views that shale gas development is not safe or transparent and fears that fracking in Lancashire constitutes a dangerous experiment, the effects of which cannot be entirely predicted at this stage;
- lack of transparency about the future use of the boreholes and the relationships between fracking and other developments in the area, such as the Halite Energy Group's proposed underground natural gas storage facility at Preesall.
- perceived failures to act on its promises;
- doubts about the full disclosure of chemicals used in the fracking process (Watson, 2014); lack of transparency about the facilities and uncertainty about the sufficient flowback fluid treatment capacity in the UK (Campaign to Protect Rural England Lancashire, 2014);
- uncertainties about the impartiality of the police with regard to the policing of anti-fracking protest in the light of reports on the Memorandum of Understanding between IGas and the GMP about the Barton Moss camp;
- unwillingness on the part of local residents to accept the company's designation of the exploration projects in Lancashire as temporary developments;
- the perceived inability of the company's representatives, experts and PRs to answer the residents' questions to a satisfactory degree;
- concerns about the accuracy of some of the planning documents presented by the company; lack of consideration for the health and age demographic in the proposed fracking areas.

It is important to understand the significance of the level of distrust regarding the gas company. As this research has found, providing more information about the development has not changed local attitudes towards shale gas. The way in which the residents assess this information (as either convincing and credible or deceitful and unreliable) depends to a large degree on how they evaluate the company's trustworthiness. If the residents express distrust in the company, they are also most likely to challenge or reject its information, especially if there is evidence and expertise available that counters the information provided.

Box 7.1 'A story of trust'

"Mine is simply a story of trust. I live in Little Plumpton, in one of the oldest and largest properties on the Fylde coast built in 1848... I've lived on the Fylde coast all of my life. I've always been an advocate of the area. My children have been schooled there and I've built my businesses here from scratch including one which had got up to 300 people, a hundred-million turnover and I have offices in London and Europe but I've always had a head office in Blackpool. And in the time that I have run that business of seven years, the Chamber of Trade never contacted me so they're not representing me, I can tell you that. In May 2012 I was away on business and my wife phoned me to say that cables which looked electrical and unsafe have been laid in my garden with coloured stakes. I rang my solicitors and changed my plans, travelled home and, being worried about my children's safety, photographed all of the cabling. I took the children to school the next morning. As I pulled out of the drive, a guy was sitting in a van with Cuadrilla's name on it and I told him not to go back on my land. When I got back from taking the children to school, another stake had appeared in my garden painted red. We contacted Cuadrilla again and faxed them overnight saying not to go on my land. And I also contacted the police. That day a man called Brown came and he turned up with a lot of Dutch people in left-hand drive cars, which makes a mockery of local employment with this industry. And we ordered them off our land

and I asked him whilst he was doing it what the red stake was for and he said they're gonna drill 10 meters and set off an explosion. And I said, ‘well bloody good luck to you 'cause it's right near my sceptic tank and gas main so it'd had been on news at ten with that one’. So I told him not to come back and on June the 5th, without prior warning a number of explosions went off in the adjoining field. My secretary ran out of her office shouting, 'is it safe? Is it safe?' This was Cuadrilla's seismic testing survey. Clear damage was being done to my properties which literally lifted off the ground. We should have been warned about the explosions but due to an administrative error, they never told us.

They did undertake not to make any more explosions until on the 12th June they rang me and said ‘we're gonna do some more anyway’. I told them they couldn't and they did anyway causing more damage. I got a written apology from Cuadrilla's then CEO saying they shouldn't have done it, etc. but I had to sue them for the trespass on my land and I took it to court. The issue against them, they've made my life a misery. I'm still fighting them for the damage to my home. I've got loads of damage. They keep rebutting me with long letters saying that my house built in 1848 which sat there for 160 years, it must be my fault that it's now cracking. Absolutely disgraceful. Millions of damage cause it was built on footings which won't withstand this type of industry. If permission is granted, I'm leaving Lancashire with my family. I'm selling the businesses, I'm selling the properties and I'm off, I'm not staying here. That's a loss to Lancashire; that's more jobs than [exploratory projects] would create and that's a real significant financial blow to Lancashire as well cause I've employed lots of people. It's given me high blood pressure as well, which I'm not happy about. I'd say this to the people at Lancashire's council: I don't trust Cuadrilla, that's it. If you've got a battle with them, it will last years. That's no way to treat people. This isn't a seduction; this is the closest thing that I can think of that's akin to a rape."

(Photo: Protest at County Hall in Preston, June 2015)

8

GENDER RELATIONS IMPACTS

The gender inequalities and imbalances that exist in every society tend to be aggravated by development, largely because men tend to benefit most from the new job opportunities (Srinivasan & Metha, 2003) while the women are often responsible for dealing with the negative effects of resource extraction projects, such as local contamination or care for the ill. The division of production-oriented labour is therefore also gendered, meaning that different aspects of the workload are distributed unequally between men and women.

It is likely that the effects of shale gas extraction in Lancashire will be unequal for men and women. Boomtown-related research from the US suggests that while few benefits of shale gas developments seem to accrue to women, they face the risk of increased domestic violence as well as assault in places with significant numbers of incoming gas workers (Food & Water Watch, 2013). Research in the US has reported that women in communities with operating shale gas projects are less likely to go out by themselves during the day or evening (Archbold, 2013). There is also a risk of gendered policing of protest (see the section on policing).

The local economic growth that may result from the development is also not gender-neutral, as there is a significant imbalance in the way in which the benefits of a project are usually distributed and calculated, i.e. by disproportionally benefiting the men (Srinivasan & Metha, 2003). The shale gas industry creates a number of relatively high-skilled professions. Oil & Gas UK point out that the number of women employed in the industry has remained relatively low since 2008 and that they are primarily employed in administrative and

supporting catering sectors (in Regeneris Consulting, 2011). The situation is unlikely to change as a result of shale gas exploration and extraction.

A different understanding of the possible benefits and costs may, therefore, arise as a result of this imbalance. While the men may stress the economic benefits and creation of jobs, the women may tend to point to a broader set of possible effects, including those related to the environment, safety, health as well as community cohesion and well-being. Survey results seem to confirm the gap in the ways the benefits and costs of shale gas extraction may be divided between men and women (Boudet et al., 2016). In the general society there is a significant gender divide in support for shale gas extraction in that 58 percent of men in the UK are in favour of extraction while only 31.5 percent of women are (O'Hara, Humphrey, Andersson-Hudson, & Knight, 2015). Within the anti-fracking groups, however, men feel the same way about the possible effects of fracking as women do.

This research has found no evidence that women were excluded from the decision-making concerning shale gas or that men exercised more influence in the way the communities were dealing with the issue. In fact, women in Lancashire took leading positions in the majority of local anti-fracking groups and played a prominent role throughout the planning process and during campaigning.

In the opinion of many women engaged in this issue in Lancashire, this prominent role that they have played has provided a necessary counterbalance to the resource extraction industry as well as political circles that are dominated by men and may be perceived to espouse machismo (Monbiot, 2013). A potentially subversive function of 'female inquisitiveness' seems to have been recognised by the industry in, what appears to be, the discriminatory practice of some US land men who have used gender dynamics to secure land leases. According to what is apparently a manual for land men, they have been advised that:

> Men are more likely to sign than women. Men don't like to believe that you know more than they do, so they are also less likely to ask questions. In the state of Ohio the husband can sign the lease without spousal permission. Go that route if required. Tell them it is their decision. Write the lease agreement with only the husband's name on the paperwork. This will make it more likely that they will sign alone. Men are also more conservative, and more likely to want oil and energy independence. Women will have more concern for the environment and will challenge you more often. Knowing who to approach can seal the sale.

Conversely, in Lancashire, especially within the Lancashire Nanas group, there has been a strong ethos of sisterhood, as this member explains:

> I would stand behind anybody who is against fracking. I don't need to know the rest of your history, I don't care. But if you stand here against fracking, we're together. But you do get involved with the people around you and... you hear about the things in their lives and you start to work out how they got here and their reasons for getting involved and there is sisterhood... Our core group... we laughed, we messed about, had a few rows, nothing major but perceptions and having to let go and just chill and not be judgemental and keep reminding that we are women we stick together. Easy to say but you have to live by them but we did for three weeks and we are now a core group of women that would do anything for each other.

Equal control over and access to knowledge and the political process as exercised by the men and women of Lancashire as well as their active involvement have had an emancipatory effect on women and has been perceived as part of a global emancipatory effort, as another member of the Lancashire Nanas group put it:

> So we've been led by these crazy people for so long and maybe the only people that can stop them are us and... we [women] had the vote [but] we were still a slave essentially. But now we grew up and we grew out of that and we seized a bit of our own strength back that maybe it's down to us because, you know, I know there are women just like me in South America, Africa, India and they are standing up but they're also being shut for standing up or they're being thrown out of their homes for standing up and things go wrong... And the way I like to think about it is that every other grandmother who isn't this colour and living in this country who can't do what I can do so therefore, while I have this freedom, I should use it and I should maximise it on behalf of others; otherwise it's very unfair I think. It's our responsibility to

stand up.

The women and men of Lancashire have assumed their personal autonomy and have used their independence, self-respect, self-reliance and mutually respectful and productive cooperation in order to counteract the actual as well as anticipated gender imbalances they have experienced in the course of their engagement with politics and the resource extraction industry.

(Photo: Residents speak before Public Inquiry, Blackpool; February 2016)

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