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Societal responses to CO_2 storage in the UK: media, stakeholder and public perspectives

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Abstract

This paper summarises results from empirical research with the broad aim of exploring societal responses to CO_2 storage, framed around the concept of social license to operate (SLO). The essential characteristic of SLO is based on a partnership between communities, operators and government and is thus dependent on a variety of factors that contribute to building trust between the stakeholders. Drawing on data from media analysis, stakeholder interviews and focus groups deployed in two locations in the UK, we explore social factors that could influence an emerging SLO for CO_2 storage in the UK, drawing lessons from an analogous technology.

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Keywords: social license to operate; fracking, focus group, CCS

1. Introduction

This paper summarises results of empirical research with the broad aim of exploring the wider social context in which the scientific monitoring of stored CO_2 takes place in the UK and the ways in which experience of previous technologies might influence those responses. Here we describe an empirical approach in which we unpack the social context and local conditions relevant to a proposed CCS project and which we contrast with the more well-

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known technology of hydraulic fracturing for shale gas exploration.

The research is framed around the concept of 'social license to operate' (SLO), enabling us to go beyond a simple framing of 'acceptance' to make a more nuanced assessment of the relationships between communities and technologies [1]. SLO can be broadly defined as informal permission given by the local community and broader society to industry to pursue technical work ([2], quoted in [3]). Research in Australia, where the term SLO was first adopted, suggests that, in the context of the limited experience and wider public awareness of CCS technology, any SLO for CCS remains highly provisional and hence, fragile [3]. It is thus useful to explore the issues that might impact an emerging SLO and what lessons might be learnt from analogous technologies, such as hydraulic fracturing for shale gas (fracking).

The two technologies, fracking and CCS, are at different stages of development. Fracking is a technology that is well established overseas (e.g. in the US) and has been subject to very visible controversies both in the US context, and in the UK. Moreover, there has been experience of locally induced seismic activity associated with the initial fracking activity and high profile project applications in one of the two study regions [4, 5]. In contrast, CCS technology is at a much earlier development stage; it has not established significant commercial deployment and remains an unrealised technology in the UK. The handful of overseas CCS projects have received a mixed reception from their host communities, both positive (e.g. the operational Boundary Dam) and negative (e.g. Barendrecht, cancelled under significant opposition). Hydraulic fracturing for shale gas exploration has become a highly politicised technology that has attracted media attention, CCS, in contrast, remains a relatively unknown technology amongst lay publics (see e.g. [6]). We have explored the role of hydraulic fracturing for shale gas exploration as a potentially analogous technology to CO_2 storage because of its use of comparable operational processes in the utilisation of the subsurface in relation to fossil fuel energy use [7] and the potential for common issues to be raised in this context, notably in the light of induced seismic events in Lancashire, UK, in 2011 [8, 4]. The research presented here thus sought to explore whether and how responses to CCS might be affected by the domestic debate on fracking. We report on empirical research investigating potential responses to CCS (and, in particular, views about CO_2 storage) in two areas which had respectively: i) recently experienced high profile planning applications for a new energy technology (hydraulic fracturing for shale gas exploration –'fracking'), but no CCS proposals (Lancashire, in north west England) and ii) the potential to establish an industrial CCS cluster, benefitting from some initial government funding to support an industrial consortium (the Teesside Collective), but where fracking was not likely to be pursued in the near term (Teesside, in north east England).

Results draw on three strands of empirical data: (i) review of media articles around two 'events' relating to CCS and hydraulic fracturing for shale gas respectively; (ii) stakeholder interviews; (iii) focus groups with members of the lay public in two regions of the UK. Nerlich and Jaspal [9] report on how the media reporting on CCS has waxed and waned in the UK as the political landscape changes and the important relationship between key stakeholders and the press in setting and building the media agenda. By considering stakeholder, press and public discourses in CCS at different scales, this paper begins to unpack the context in which an SLO for CCS might be realised.

2. Methods

2.1 Print media analysis

An initial scoping of the two technologies entailed an analysis of print media reporting relating to two recent (within the last 5 years) events for each technology respectively; Table 1 sets out the details of the media searches. This provided an indication of national, regional and local views on the two technologies, enabling us to build a picture of the wider context and debate before exploring the views of relevant stakeholders and lay members of local communities on key issues in the two locations. The 'events' selected for this analysis provide relevant examples of news articles relating to particular developments which attracted media attention. Articles were sourced using the Factiva database.

Table 1. Media searches on fracking and CCS events

Location	Event	Dates	Search terms
Shale Gas Blackpool	Seismic events relating to Preese Hall well	01/01/2011-31/12/2011	Site name + Shale gas + fracking + Blackpool
Shale Gas Lancashire	Public Inquiry – into planning applications for shale gas exploration at 2 sites: Roseacre Wood and Preston New Road, Fylde	01/12/2014 - 16/03/2015	Site name + Shale gas + fracking + Lancashire
CCS Peterhead	Peterhead awarded FEED study funding	01/01/2014 - 16/03/2015	Peterhead + Carbon capture and storage +_ CCS
CCS Teesside	Tees Valley Collective launched	01/01/2013 - 16/03/2015	Teesside + carbon capture and storage + CCS

2.2 Stakeholder interviews

In the second stage of the analysis, we conducted a total of twelve semi-structured interviews with stakeholders in which we explored respondents' views with respect to both CCS, with a focus on CO_2 storage, and hydraulic fracturing for shale gas. Representatives of local, national and European Government, NGOs, industry, and academia from the two case study regions were asked similar questions about both CCS and fracking, covering awareness of the technology and its impact on the local areas, arguments in favour and against the technology, siting decisions, information sources and sharing, influence of campaigning groups and community engagement. Interviews took place between July and September 2015 and lasted from 40 – 90 minutes. Interviews were conducted with eight stakeholders located within the Teesside area, three in Lancashire and two from national organisations providing services to local authorities.

The timing of recruitment in the Lancashire coincided with the decision on an application from Cuadrilla to Lancashire County Council for licenses to commence exploratory drilling for shale gas in the nearby town of Preston. This application was extremely controversial locally and although permission was denied due to noise and traffic concerns, the prospect of an appeal remained [5]. Following up declined interview requests at the start of the recruitment process revealed a deeply held reluctance to discuss the technology, although there were no formal embargoes on discussing the subject from any of the organisations contacted, and despite stressing the independence of the research and the primary focus on CCS technology. Although we returned to recruitment in the Lancashire area following completion of the Teesside interviews, widening the geographical scope within the county from the initial focus in the Blackpool area, the difficulties in securing interviews remained and is reflected in the small number of stakeholder interviews in this area.

2.3 Focus Groups

Finally, we conducted two focus groups with members of the lay public in Lancashire and Teesside during November 2015. Both groups were held in community facilities (scout hut and village hall) in residential areas close to industrial areas and the coast. In each group, the focus was on CCS, and specifically storage and monitoring; this framing was consistent with the broader DiSSECS project objectives and sensitive both to the challenges encountered during the stakeholder interviews in relation to shale gas and potential public reactions. Where shale gas or fracking was raised spontaneously by focus group participants, facilitators supported those discussions but returned the focus back to CCS. Each group was structured according to a common topic guide, which was designed to explore some of the themes that emerged during the stakeholder interviews and the extent to which the views of the public participants were consistent with those of the professional stakeholders. An academic expert from the DiSECCS project presented information about CCS in general, and storage and monitoring in particular, to the groups; this expert was available for questions following the two short presentations but left the room for the subsequent discussions. A professional company was employed to recruit focus group participants resident in the specified areas (max 10 people per group), screening was performed to ensure no participants were: a) employed in the shale gas or CCS industry; b) a member of a campaigning group relating to shale gas or CCS or

c) had previously participated in Focus Groups conducted by the research team; each participant received a £40 high street voucher. Each group lasted for 2 hours and was recorded, transcribed, and imported into Atlas.TI for thematic coding, by a minimum of two individual coders in order to ensure accuracy and lessen bias.

3. Results

3.1 Media

Figure 1 shows that, despite media tracking over a much shorter time period, shale gas attracted a much higher press coverage in the print media than the two CCS projects did (290 and 201 articles compared with 115 and 83 articles respectively) and with a higher representation in broadsheets (40% of all shale gas articles compared to 12% of CCS articles). Relatively few articles on either energy technology appeared in the national tabloid press, with the exception of the shale gas developments in Lancashire, for which 40 out of a total 200 articles were in the tabloid press. The Teesside CCS initiative was very little reported in the national press, with the majority of articles appearing in local publications (out of a total of 83 articles, 48 were in media local to the project and 23 local media further afield, although all still in the North East of England). Although there were 31 articles on the Peterhead CCS project (out of 115) in the national press (which includes key Scottish newspapers), the project attracted little attention locally, the majority of articles featuring in trade and industry press.

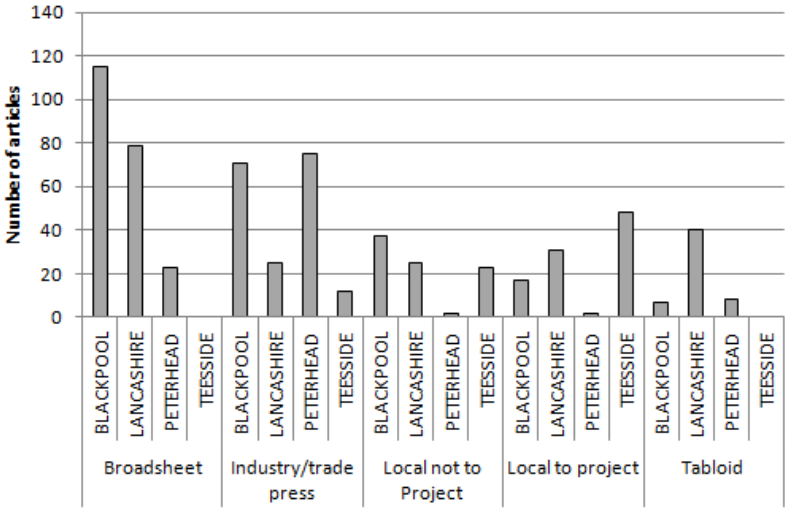

Figure 1. Articles relating to fracking (Blackpool, Lancashire) and CCS (Peterhead, Teesside)

3.2 Stakeholder interviews

CCS was viewed very positively by all of the stakeholders interviewed in the Teesside region, and potential economic benefits were identified as being particularly significant for the area in terms of maintaining the local chemical and process industry in the region, attracting investment and the associated local employment opportunities. Interviewees were asked about potential negative as well as the positive impacts of the technology – while some struggled to identify negatives, technology costs and who would bear them (NGO), possible public scepticism (MP) and concerns about possible leakage of stored CO_2 (MEP) were raised.

Interviews with the Lancashire and national stakeholders were more focused on fracking with more limited discussion of CCS, due to a self-declared greater awareness and understanding of the former in relation to the region. Tensions between political priorities, particularly at a national level, and the regulatory process were identified by several stakeholders with respect to fracking. However, the scepticism associated with fracking was

not voiced in relation to CCS by any of the interviewees in this region; CCS was also viewed in a broadly positive light by these stakeholders, the only concern, raised by an academic, related to any possible local impacts or leakage risks. Stakeholders in both Lancashire and Teesside identified shortcomings in the current planning process, which was considered to lack transparency and tended to be combative, with poor dissemination as a factor that could erode trust in the governance of proposed technology projects. Both the regional and national stakeholders expressed a keen awareness of the long term impact on perceptions of a technology, such as fracking, once it becomes tarnished by high profile controversy. CCS was seen by respondents in both regions as a much less controversial approach than fracking.

3.3 Focus Groups

The Lancashire Focus Group discussions were strongly influenced by previous, unanimously negative, experiences of fracking, with participants seeking reassurance that CCS was a different technology. This group's initial responses to CCS focused on the possible impacts and risk associated with storage. In Teesside, the community was facing significant job losses due to the announcement of the closure of the steel works the preceding week and participants were focused on the benefits the technology might bring to the local economy. Further, Teesside participants echoed a sense of pride in the region's industrial legacy that was also expressed by stakeholders, typically viewing CCS as an incremental technology applied to existing industrial activities.

Concerns regarding the subsurface also differed depending on whether the storage and monitoring of CO_2 was implemented onshore or offshore, in both groups a clear preference for offshore storage in the UK context was expressed. Both groups spontaneously raised the potential impact of natural earthquakes on the integrity of storage reservoirs, no-one raised concerns about the potential for CO_2 storage to induce seismicity. Both Focus Groups discussed the relationships with government and industry. In Lancashire, referring to the recent shale gas controversy, participants felt that the council had not listened to communities initially, perceiving a lack of action until protest reached a certain point at which it could no longer be ignored. Perceptions of "who pays for" and "who benefits from" these technologies was another recurring theme in discussions, including, for example the option of reinvesting in the industry to further improve operations. Participants in the Teesside group clearly recognised the tradeoffs involved with hosting the heavy industries in their local area. Nevertheless, there remains a delicate balance between communities identifying the potential for a project to provide mutual benefits to communities and industry and scepticism towards compensation schemes which can erode the social license. Furthermore, in Lancashire, there was a sentiment that the industry and government were not interested in the community benefits, rather there was a perceived disconnection from environmental concerns, with a focus on financial profit.

A critical factor in how conditions for achieving a SLO may change over time is how experiences with other technologies or projects influence perceptions. This was particularly evident in the Lancashire group, where recent applications for licenses to explore for shale gas had been highly controversial. When fracking was raised by this group it was in the context of how the council handled and responded to the planning applications but participants also initially evaluated potential impacts of CO_2 storage with reference to experiences with fracking; both groups sought reassurance that CCS was different to fracking. Discussion in Teesside revealed a delicate balance whereby, despite living with and depending on large industrial installations, the underlying awareness of associated risks was ever present, even though there had been no major incidents in the area. Both focus groups articulated a greater level of trust in industry than local government to manage CO_2 storage, typically expressing confidence in their technical competence, supporting the views expressed by the professional stakeholders. However, the strong trust in industry expressed in the Teesside group contrasted with a more mixed view evidenced in the Lancashire group.

4. Discussion and conclusions

This article describes a body of empirical research exploring the social context in which a social license to operate CCS might emerge, drawing on experience in the UK related to exploratory hydraulic fracturing for shale gas. Fracking technology has received a significant level of press attention in the UK in recent years, having been linked to induced seismicity in the north west of England, and has been associated with a series of high profile public protests at proposed sites; a controversial ongoing planning application in the Lancashire region at the time of

the research has influenced stakeholder and lay responses in the local area. In contrast, the smaller volume of media articles in the print press relating to CCS, dominated by articles in local or specialist publications, supports previous research findings that CCS has not yet captured the wider public imagination [6]. While the arguments for and against shale gas technologies have been widely rehearsed in the press (see for example [10]), the representation of CCS in the media is far from established – in terms of both volume and content.

Previous research has identified the importance of economic arguments framed in terms of investment, employment and leadership opportunities and the possible benefits that CCS might bring alongside reductions in greenhouse gas emissions (see for example,[9, 11]. The importance of the relationship between the press and key stakeholders in influencing opinions on the technology within civil society has also been identified [9, 12]. Results from empirical research presented here reinforces the importance of economic arguments for establishing CCS in the UK, from the perspectives of both stakeholders and local communities. This is particularly evident in the context of the Teesside study region where the local economy is dominated by a cluster of process industries which provide significant levels of employment in an economically deprived area. Furthermore, the establishment of the Teesside Collective, which plays a significant role by regularly producing press releases and efforts of local key stakeholders in talking to the press highlights the importance of these relationships.

However, conditions for establishing an SLO go beyond merely establishing the economic benefits of the technology; trust and confidence in the ability and motivations of public and private sector institutions to implement and manage the technology are critical. In the context of the fracking debate, while identifying the economic and employment benefits as arguments in favour of shale gas exploration, local residents expressed scepticism about the potential for shale gas to deliver these benefits. Furthermore, residents in Teesside are acutely aware of the tradeoff local communities make in accepting the physical risks that may come with the benefits of living alongside particular industries. However, a high level of confidence in the industry's ability to manage CCS in Teesside was expressed by both stakeholders and lay participants alike, and a long history of pioneering industry in the Teesside region was repeatedly cited as grounds for trust in the companies involved. In contrast, in Lancashire, where companies involved in bringing fracking to the area have no such established reputation, the industry was viewed in the community with scepticism; focus group participants tended to express distrust in companies' ability to self monitor and deemed companies to be driven by short term profit. This distrust in industry was compounded by perceived dissonance between different scales of governance; on top of perceived differences in political and policy priorities at local and national levels, shortcomings in the planning process were also seen by some stakeholders to contribute to an erosion of trust in planning and regulatory processes.

Both the regional and national stakeholders expressed a keen awareness of the long term impact on perceptions of a technology, such as fracking, that has become tarnished by high profile controversy. Past experience of previous technologies may influence participants' opinions of other new technology; once trust is breached and SLO shifts, it can be difficult to rebuild, with the effects potentially spilling over to influence responses in the context of a different technology.

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