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Exploring support for shale gas extraction in the United Kingdom

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HIGHLIGHTS

- September 2014 survey of British attitudes towards allowing shale gas extraction.
- Over 75% or respondents correctly identify shale gas.
- 43.11% of respondents support shale gas extraction in the UK.

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ABSTRACT

The development of shale gas in the United Kingdom (UK) using hydraulic fracturing, more commonly known as 'fracking', remains in its infancy. Yet understanding public attitudes for this fledgling industry is important for future policy considerations, decision-making and for industry stakeholders. This study uses data collected from the University of Nottingham, UK nationwide online survey (n=3823) conducted in September 2014, to consider ten hypothesises about the UK public's attitudes towards shale gas. From the survey data we can see that 43.11% of respondents support shale gas extraction in the UK. Furthermore, our results show that women, class DE respondents, non-Conservative party supporters, and respondents who positively associate shale gas with water contamination or earthquakes are less likely to support the extraction of shale gas in the UK. We also discuss potential policy implications for the UK government arising from these findings.

1. Introduction

The extraction of shale gas/oil through hydraulic fracturing, more commonly referred to as 'fracking', has become a controversial topic in both the United States (US) (Boudet et al., 2014; Davis and Fisk, 2014; Evensen et al., 2014) and in the United Kingdom (UK) (Cotton et al., 2014; Williams et al., 2015). Hydraulic fracturing as a means to extract shale gas/oil has experienced significant growth in many states in the US. This rapid expansion of shale gas development in the US since the early 2000s has resulted in shale gas accounting for 67% of the US's natural gas production in 2015 (USEIA, 2016a). The result of this rapid growth in US shale gas development has been to lower the price of natural gas and to be the key driver in making the US a net exporter of natural gas by 2017 (USEIA, 2016b).

The situation in the UK is very different; shale gas exploration is in its infancy with only a few test drill permits issued to date. The first permit was issued to Cuadrilla in 2007 to explore the Bowland shale in Lancashire, with the first test drilling taking place in March 2011. Drilling was suspended following two small earthquakes on 1 April and 27 May 2011(measuring 2.3 and 1.5 on the Richter scale respectively) near the drilling sites (Green et al., 2012). Two years later, Cuadrilla drilled an exploratory borehole at Balcombe, West Sussex in August 2013. There were much publicised protests against unconventional hydrocarbon development near the drilling site between July and September 2013 (Tarver, 2013). Cuadrilla announced that they had finished drilling in September 2013 (Cuadrilla, 2013). Despite such protests twenty-seven new areas totalling over 1000 square miles in Northern England and the Midlands region of England were approved for possible shale gas exploration in August 2015 (Bawden, 2015).

A number of alleged negative environmental impacts are associated with hydraulic fracturing. Perhaps the most widely-cited negative impact is the potential contamination of drinking water, as featured in the controversial film *Gasland* (Fox, 2010). Other negative impacts associated with shale gas development include earth tremors, the large quantities of water consumed during the hydraulic fracturing process, heavy traffic to drilling sites,

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fracturing wastewater disposal and the infrastructure[1] needed to transport the gas or oil from the well (Jacquet, 2014).

One of the key arguments presented in favour for the development of shale gas is that it could be a transition fuel from a high to low-carbon society (GreenWise, 2012). This would be achieved primarily through the displacement of coal in the energy system because shale gas produces around half the greenhouse gas emissions of coal at the point of production (MacKay and Stone, 2013).[2] Additionally, the development of shale gas in the UK could reduce the UK's reliance on imported natural gas. The UK imported 43% of its natural gas in 2012 (UKOOG, 2013) and is expected to import around 70% of its natural gas by 2030 (DECC, 2015b).

With the development of UK shale gas in its infancy and the growing debates around whether domestic exploration should continue, the public's attitudes towards this potential energy source is a key issue in determining government policy, industry practice and stakeholder engagement. Research concerning public attitudes towards shale gas is an emerging field and the focus of extant literature has been on attitudes towards shale gas/hydraulic fracturing in the US. There are a limited number of surveys and data available in the UK. Research into attitudes towards shale gas in the UK is a field that, at the moment, is data poor. Surveys are, however, an important tool to assess attitudes towards emerging fields like shale gas extraction/hydraulic fracturing in the UK.

We provide a first overview of attitudes towards shale gas extraction in the UK using national survey data, thereby filling a gap in the existing literature.

2. Literature review and hypotheses

The literature focusing on shale gas in the UK remains limited. There is some literature relating to policy aspects of shale gas, i.e. regulation (McGowan, 2014), discourse analysis about the UK hydraulic fracturing debate (Cotton et al., 2014; Williams et al., 2015), examining the debate in UK newspapers relating to hydraulic fracturing (Jaspal and Nerlich, 2014) and public perceptions relating risk perceptions and policy support in three UK regions (Whitmarsh et al., 2015). There is, to our knowledge, no literature about attitudes towards shale gas extraction using a comprehensive national UK survey. Our article attempts to fill this gap. Our choice of hypotheses and independent variables are informed by testing a number of theories relating to attitudes towards shale gas in the US and concerns about environmental issues.

2.1. Demographics

Socio-demographic characteristics are expected to contribute to attitudes towards shale gas (Boudet et al., 2014). Socio-demographic characteristics, including gender, age, household income, educational attainment and social class[3] play an important role in explaining attitudes to e.g. political parties, welfare policies or support for emerging technologies (Nawrotzki and Pampel, 2013; Svallfors, 2012; van der Eijk et al., 2007). Men are generally more positive towards conventional/non-renewable emerging technologies whereas women are less supportive of non-renewable emerging technologies, but are more supportive of renewable emerging technologies (Ansolabehere and Konisky, 2009; Siegrist et al., 2007; Xiao and McCright, 2014). For example, women in Switzerland were more accepting, saw more perceived benefits with lower perceived costs for renewable solar energy and wind energy than men. Additionally, men in Switzerland were more accepting and saw more perceived benefits with lower perceived costs for conventional energy than women[4] (Visschers and Siegrist, 2014). US and Swedish studies carried out in the last ten years found that women were more concerned about the environment and less likely to support non-renewable emerging technologies than men[5] (Ansolabehere and Konisky, 2009; Firestone and Kempton, 2007; Hunter et al., 2004; Liu et al., 2014; McCright, 2010). There are different explanations for this discrepancy in acceptance of emerging technologies and environmental concern between the genders. Men generally display a lower level of risk perception than women and are therefore more supportive of emerging technologies and display lower levels of environmental concern. Women, by contrast, are more risk averse than men (Kahan et al., 2007, 2009; Pidgeon and Demski, 2012; Satterfield et al., 2004; Sherman, 2004). This informs

Hypothesis 1. Women are less likely than men are to support shale gas extraction in the UK.

It has been argued that attitudes towards the environment are developed during childhood and the teenage years (Inglehart, 1990; Inglehart and Abramson, 1994). These attitudes are not expected to change much once an individual reaches adulthood. We theorise that attitudes towards the environment and in our research towards shale gas extraction are developed at a young age. Younger respondents will likely have been educated through the UK school curriculum which includes anthropogenic climate change and its causes. As a result, the younger respondents are more likely to be aware of negative impacts of fossil fuels and also more supportive of renewable energy sources (Hayward, 2012). Older respondents are therefore thought to be more supportive of shale gas extraction as they have not received the same level of education about the environment as younger respondents (Nawrotzki and Pampel, 2013; Zhou, 2015). This view accords with Inglehart's (1981) 'socialization hypothesis' that basic values reflect the prevailing conditions of pre-adult years. This age/attitude association is confirmed in the US context by Boudet et al. (2014). Older respondents have also been found to be less supportive of green technologies e.g. wind power (Boudet et al., 2014; Firestone and Kempton, 2007) and are therefore expected to be more supportive of shale gas.

Hypothesis 2. Older respondents are more likely to support shale gas extraction.

Franzen and Meyer (2010) theorise that individuals with higher incomes are more likely to display higher levels of environmental concern. Boudet et al. (2014) and Davis and Fisk (2014) did not find a statistically significant relationship between income and attitudes towards shale gas extraction. Zhou (2015) argues that individuals with lower incomes are less likely to be concerned about the environment as their focus in on supporting themselves and are therefore not able to pay a premium for environmentally friendly options. The role of income as an association to an individual's environmental concern is contested and Xiao and Dunlap (2007) argue that income is not a good indicator for environmental concern. Whether income is related to environmental concerns and attitudes towards shale gas is contested in the US

[1] E.g. pipelines.

[2] Although this figure is critically dependent upon assumptions about levels of methane leakage, 'fugitive emissions', in the production process (Cathles et al., 2012; Howarth, 2015).

[3] Social class has, to our knowledge, not previously been used in the attitudes towards shale gas literature.

[4] Men were still more accepting of, saw more perceived benefits and lower perceived costs with wind and solar power than for the other forms of energy.

[5] It is worth noting that gender differences in the US were found only for Caucasian respondents as reported by Kalof et al. (2002). However, a study that looked at gender and minorities found that women and minorities displayed similar levels of environmental concern (Bord and O'Connor, 1997).