

3.3B Focus on Literature Survey – Model “Fracking”

3.3B Task 1 - Analyse the question

What are the key words in the question rubric?

Write a survey of the two provided papers. You should give an overview of the content of each, find similarities and differences in the ideas they put forward and assess the usefulness of each in relation to the research essay question you have been given, which is to evaluate the pros and cons of hydraulic fracturing.

Abstract

The present paper looks at two examples of secondary research into hydraulic fracturing, with reference to two key issues: the economy and the environment. Firstly, a brief statement of the main ideas in each article is provided and then both are compared in terms of content. This reveals that they share many thematic commonalities despite the fact that their main focus differs. The final section assesses them with reference to academic quality and their usefulness to further research on the same topic. It is found that they both have merit and will be relevant although the greater detail and comprehensiveness of the first paper renders it the more useful resource of the two.

Introduction

The purpose and scope of this survey is to review two research literature texts and evaluate their usefulness for a piece of secondary research on the topic of fracking. The papers under consideration are: Paper 1 - Natural Resource Development for Science, Technology, and Environmental Policy Issues: The case of Hydraulic Fracturing by R Jain; Paper 2 - Cornucopia or Curse? Reviewing the Costs and Benefits of Shale Gas Hydraulic Fracturing (fracking) by B Sovacool.

Although there are many issues connected to fracking, such as health, politics and safety, both selected papers deal with two of the key issues, namely the economy and the environment. Hydraulic fracking, which is commonly called fracking, is a process used to extract oil and gas from the earth. During fracking, fractures in rocks below the earth's surface are created and then widened by injecting chemicals and liquids at high pressure in order to extract oil and gas. Academics, politicians and the general public are deeply divided on the topic, with some believing it to be the universal panacea for the global fuel crisis and others viewing it as a harmful process which should be closely investigated.

Paper One

The main thesis of paper 1 is that fracking should be scrutinised and regulated more closely, because of controversy surrounding its unpredictability, negative health and environmental consequences. Jain's paper provides a background to fracking, weighs up the economic benefits against the environmental impacts and illustrates the misalignment of regulation with market forces. He then identifies a need for fact-finding and finally proposes a set of regulatory principles that could be put into place.

In the introductory section he stresses that fracking is a highly contentious issue due to the incompatible interests of the many different stakeholders involved. He suggests a framework of regulations to resolve the conflict between parties and reconcile economic development with health and

environmental concerns associated with fracking. Jain goes on to briefly outline the process of fracking, concentrating on the idea of proppants (chemicals added to the fracturing fluid to keep the fracture open). He points out that of the possible 2,500 chemicals in use, 650 are suspected of being cancer-inducing.

In considering the economic benefits, Jain notes the projected increase in fracking will greatly benefit the US with a market edge over countries such as China, where energy costs are considerably higher (\$1000 per ton of propane compared to \$620 in the US). He also lists a range of financial advantages of the US being energy independent.

On the other hand, Jain reports doubts about the economic benefits of fracking. He cites research that has found only a 0.4% rise in GDP is indicated in the short-term use of fracking and that this increase in GDP is unlikely to continue into the future. In brief, he explains the nature of boom-bust cycles and the way that the sudden financial gains of fracking are likely to be exported out of the community, rather than be reinvested into sustainable business or enterprise that could continue to generate growth.

Environmental regulation, Jain explains, is problematic to a free market economy because it may increase production costs and discourage investment. Labour and investment are perceived as finite resources, to be cared for and used sparingly, whereas the environment has always been viewed as infinite, not to mention free. Environmental degradation and its economic and social impact are ignored, in favour of the highly valued goods and services produced by fracking. Jain suggests there are two possible solutions: either to eradicate anything that could jeopardise an efficient market process (e.g. danger and uncertainty around extraction processes) or to countermand fracking's supremacy and place the interests of the environment above economics.

In the second part of the paper, Jain categorises harmful environmental consequences of fracking including air and water pollution, excessive water use, toxicity, radioactivity and earthquake risks. He calls for 'joint fact-finding' through independent, impartial agencies to investigate impacts so that a certain scientific truth can be established about fracking and its effects.

The final section deals with recommendations for policy making and Jain advocates regulatory agencies to oversee standards and ensure the protection of human health and the environment. He also calls for science-based decision-making to reduce the relevancy of media-driven campaigns that may be funded by interested parties. Finally, he advocates compensation for damage done to areas already affected by the fracking process.

Paper Two

The Sovacool paper begins with real-life examples to illustrate the positive and negative effects of fracking. He questions which of the two pictures best represents reality and claims that both are true, pointing out that research exists to either support or oppose the practice of fracking.

The paper then overviews the history of fracking and illustrates the geological, mineral and development characteristics of shale gas. It also overviews seven phases of shale gas extraction describing the process of fracking, multi-stage fracking and horizontal drilling as well as detailing the

constituents of hydraulic fracking fluid used in the process. He also notes the explosive growth of fracking and the projections for future growth in the USA and many other parts of the world.

The third section deals with the positive side of shale gas as a fuel supply and identifies four advantages. Firstly, there is a plentiful supply and secondly, a relatively low cost of shale gas extraction. Thirdly, when compared to some other fossil-fuel energy, shale gas has comparatively less impact on the environment. Lastly, monies gained through employment opportunities and taxes contribute to financial boom that shale gas provides.

The next section looks at evidence for the negative side of shale gas production. Sovacool notes the complicated nature of the process, which is high risk, requires substantial initial investment and has considerable running costs. He points out the technology necessary to guarantee 'greener' shale gas production is not yet in place and details some of the harmful environmental effects fracking has on water, air and radioactivity. A further controversy surrounds the idea that fracking increases global-warming. Finally, the article notes the dual concern that fracking takes attention away from the development of cleaner energy forms and that there is strong social opposition to it around the world.

The conclusion highlights that a definitive assessment of the value of fracking is not clear-cut and four nuanced conclusions are provided. In relation to benefit and cost, Sovacool maintains some impacts only have regional repercussions while others are of a world-wide nature and it is necessary to assess which risks are acceptable and which are not. Second is the realization that the politics and values attached to energy systems will be a divisive issue for years to come. Third is the consideration of divergent means of shale gas development that is likely to develop around the world. The final consideration is that if regulation and governance is stringent, problems arising can be mitigated against but without this safeguard, the negatives will increase.

Comparison

The two papers in question share striking similarities in the fracking issues they discuss, with some differences in emphasis. Notably, both authors point out that fracking is a highly contentious issue, which has the tendency to provoke polarised opinions amongst a wide group of people. This provides a context for the discussion which follows.

The most obvious similarity is that both articles tackle the two key issues of the economy and the environment, looking at the positives and negatives. The common emphasis is on contamination of air and water, with both papers referencing proppants as the principal cause of contamination. Similarly, both papers stress that one of the complications is the complexity of the fracking process and its dependency on specific conditions of location, making generalisations difficult. Interestingly, both articles allude to the media hype that has surrounded fracking since it came in to public view; Sovacool refers to the fact that 'Saudi America' is now common parlance to describe the fracking boom and Jain refers to the award-winning film Gasland. They are both aware of the growing high profile nature of fracking.

The major difference between the articles is Jain's concrete suggestions for a recommended policy and regulation framework, as opposed to Sovacool's open-ended conclusion, suggesting that more control is desirable but will inevitably result in even more debate. Another notable difference is that Sovacool

places his discussion around the frame of real-world examples while Jain's approach is more theoretical and he does not refer to actual cases where fracking has brought about any of the issues. In addition, although both papers include a background description of the actual process of fracking, Sovacool goes into much more detail and ensures that even a lay person has a deep knowledge of the nature of shale gas extraction. One other similar thematic link with a difference in emphasis can be seen in the author's discussion of the various stakeholders. Jain highlights the need for co-operation amongst disparate interested parties while Sovacool uses them to stress the polarisation of ideas.

It can be concluded that these two papers complement each other well. However, what Sovacool gives the reader is a more detailed overview of the process and what Jain provided the reader with is solid and tangible solutions to an extremely thorny issue.

Evaluation

In terms of accuracy, the main advantage is that both papers have been peer-reviewed and appear in respectable journals. Their reliability can be trusted. Although accuracy might generally be regarded as the most important requirement of an evaluation of any article, in the case of fracking, currency could also be regarded as being of prime importance given its topicality. Both of the articles under review were published in 2014 so meet the need of being up-to-date. A second consideration is authority. Both authors are highly-qualified and have taught in eminent institutions, with sizeable numbers of publications between them. In relation to the length of their papers, they both have extensive reference lists and have been cited in other research on the topic. Additionally, as well as providing contact details and presenting both sides of the arguments they make, it can be said that the question of objectivity is met. In terms of coverage, the Sovacool article is much more comprehensive and includes more hard data. This makes it a rich source of information for further research. Nevertheless, accessibility is relevant and the Jain article is less dense and less technical and therefore easier to read. It also has solid concrete recommendations in the form of a conclusion whereas the Sovacool paper is more open-ended. The final conclusion, having reviewed both papers for content and academic quality, is that both will be of use for the research essay and both contain relevant information.

Words: 1890

Reference List

- Jain, R. (2014). Natural resource development for science, technology, and environmental policy issues: the case of hydraulic fracturing. *Clean Technologies and Environmental Policy*, Vol 17, Issue 1. Pp. 3-8. <https://doi.org/10.1007/s10098-014-0856-y>
- Sovacool, B., K. (2014). Cornucopia or curse? Reviewing the costs and benefits of shale gas hydraulic fracturing (fracking). *Renewable and Sustainable Energy Reviews*, 37. pp. 249-264. ISSN 1364-0321