Re-examining knowledge production in EIA

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Abstract

An Environmental Impact Assessment (EIA) is a process that systematically produces knowledge about a proposed project to inform decision makers and the public. It aims to provide an objective account of the project's impacts, mainly based on science-based methodologies, to assess the nature and extent of changes to the baseline characteristics of the study area and offer measures to mitigate any significant negative impacts. However, how this knowledge is constructed, its underlying epistemological assumptions and its role in the outcomes of the assessment and possible social responses are seldom discussed. This paper will explore how different types of knowledge can be valued in the EIA process, especially as the new sphere of climate change is incorporated. Drawing on the work of Cashmore (2004) and Callison (2014), it will discuss how the way an EIA process is modeled may lean towards scientific analysis at the expense of stakeholder input and how climate change 'facts' can have different meanings to different actors.

Research context

This paper has been developed from the early stages of PhD study that will examine how the way in which impact assessment is conducted in Scotland might influence the social responses to a proposed renewable energy (RE) project. RE deployment is seen as crucial to mitigating climate change by reducing carbon emissions. However, its scientific basis is sometimes questioned and can lead to the benefits of RE deployment being undermined. Worldwide RE deployment as a form of energy diversification is viewed as a central task, yet public opposition may slow down this process (Batel et al., 2013). Onshore windfarm EIAs, for example, raise a complex set of issues including 'landscape aesthetics, community (dis)empowerment and the relative importance of global and local factors', and there is a need to 'deepen our understanding of the social construction of public attitudes' to such projects (Warren and Birnie 2009:97). Drawing on sociology of science literature this research will examine the ways in which impact assessment is done, in particular, socio-economic impact assessment (SEIA), and how these differences might matter and influence the social responses to a proposed RE project. Such examination of SEIA and climate impacts assessment may enable the development of a more theory driven impact assessment practice.

The construction of knowledge and meaning in EIA

The EIA involves the production of knowledge and meaning in the form of supporting evidence as an 'aid to decision-making' (Glasson et al., 2012:7). The content of the EIA Report is based on the collective knowledge generated and constructed by actors involved in the project (Burr, 2015), for example, contributions from EIA technical disciplines, the developer, consultees and stakeholders. This knowledge then provides a vehicle by which to 'broker' a

decision concerning the planning consent for that project (Partidario and Sheate, 2013). This process has been replicated and developed since the origins of EIA in the 1969 National Environmental Policy Act (USA). However, it has been contended that since its inception, and partly due to rapid replication, there has been insufficient attention given to the assessment theory behind EIA practice (Becker and Vanclay, 2003; Cashmore, 2004) and that it remains anchored to a period when positivism and rationalism in the sciences predominated (Ross and Lane, 2001).

Cashmore's (2004) work explores the underlying philosophical assumptions of EIA practice. He considers the role, type and form of science involved in EIA and how this relates to decision-making. Cashmore contends that although EIA procedures and practice have developed considerably, the exact purpose of EIA and the theory underpinning the role of science within it has meant that an appropriate scientific model has not been established. This is important, as Cashmore argues, because without a comprehensive definition it is not possible to develop a detailed and complex understanding of the causal processes involved to achieve the purposes of EIA. In turn this may compromise the knowledge produced by the assessment for example, due to the type of questions asked, and the information and participants accepted in environmental decision-making (Hajer and Wagenaar, 2003). This raises questions for this research, for example, could it be that the EIA process and report influences social responses to the proposed project not just by its contents and conclusions but also through the philosophical arguments embedded within the knowledge construction process. Indeed, the extent to which members of the public are aware of and engaged in these processes may also be helpful in discussing how these processes influence social responses.

To examine this further and to explore the implications of incorporating climate change into the EIA process it is useful to consider the knowledge production process from a sociological perspective.

EIA as scientific practice

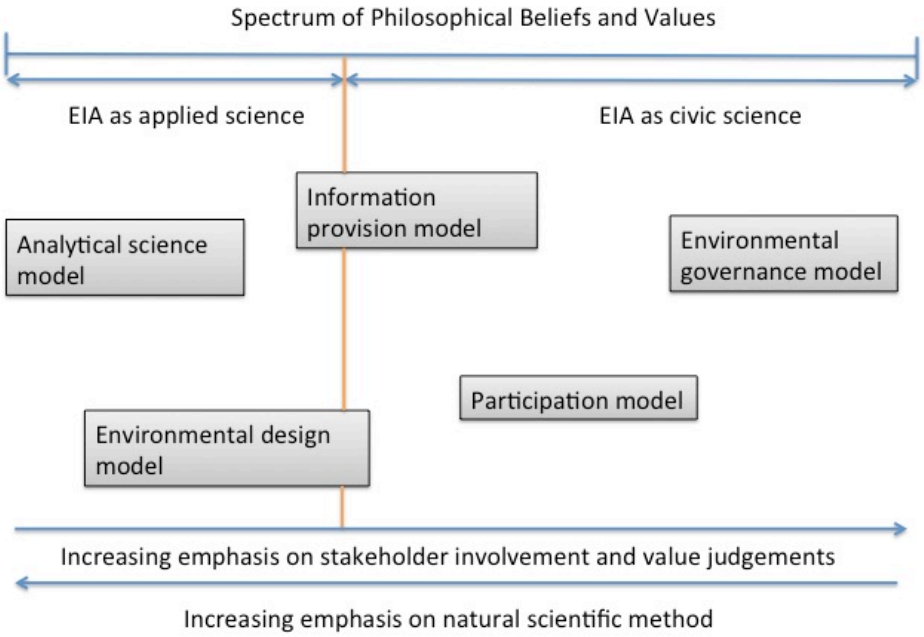
The origins of EIA legislation and its focus on the 'natural' environment has led to a predominance of applied natural science and engineering based disciplines being involved in its knowledge production. Applied science uses existing knowledge to understand practical applications, whereas pure science yields theories and predictions, as in natural sciences such as chemistry, biology, geology and physics. Those that study the role of science in society contend that in the western world science has been given special status as the reliable way to produce knowledge and understand how the world operates (Yearley, 2005). Inherent in this special status has been a demarcation between science and non-science which argued Gieryn (1983) helped scientists acquire and maintain intellectual authority.

The EIA Report is generally based on 'objective scientific facts' (Cashmore, 2004: 414) without acknowledging the inherent scientific values used in support of its

'rational' argument (Kuhn, 1977, Newton-Smith, 1981, Yearley, 2005). It may also be that by creating an artificial boundary between science and non-science that the knowledge that might be generated by other social actors or stakeholders is largely excluded. For example, the uncertain status and in some cases active exclusion of disciplines such as SEIA, which is seen by some as too value-driven and as having the potential to compromise the scientific findings of the EIA (Chadwick, 2002). Indeed, as Gieryn explains these boundaries are ambiguous and flexible, representing ideologies rather than science as 'distinctively, truthful, useful, objective or rational' (Gieryn, 1983:792). Thus it may be that the knowledge production process for EIA should be viewed as presenting a set of ideologies, of its time and place, rather than an objective and independent impact assessment. This research will examine the role of science in EIA practice and what impact this might have on other types of knowledge that might be generated by the participation of non-experts.

If, as required (2003/35/EC), EIA is to actively involve the public in environmental decision-making it would seem important for those engaging with the assessment process to understand how this knowledge is constructed and the assumptions therein. This would call for a more reflexive approach to science (Jasonoff, 2004) and the underpinning but competing scientific theories of EIA design to be made explicit as demonstrated by Cashmore's study (2004). In turn such a classification of EIA models can identify not only the role of science but also how it relates to the level of public participation within EIA. For example, Cashmore argues that close alliance to the ideas of logical positivists at his 'Applied Science' end of the spectrum (see Figure 1) may not only define the role of science within EIA but also constrain the purposes of the EIA by imposing the epistemological beliefs of science upon it. In contrast a constructionism perspective includes models under an increasingly 'civic science' approach representing a closer interaction between science, expert knowledge and the public in a more democratic planning process. For example, in his 'Analytical Science Model' there is strict separation of facts and values whereas in his Environmental Governance Model (EMG) there is an extensive role for social sciences, a limited role for natural sciences and a strong emphasis on social values and the recognition of information as a social construct.

Figure 1. Conceptions of the role of science in EIA



Source: adapted from Cashmore, 2004: 407

Cashmore (2004) contends that good scientific practice is still a core principle in these models but that the civic science models strike a balance between art and science. Critically the EMG model appreciates the political and social nature of policy and decision-making and, like all political processes, EIA 'becomes a framework for negotiation and compromise' (Ibid: 413).

Climate change, climate impacts and EIA

In EIAs for RE projects, especially windfarms, a discussion of the benefits of the proposed project in terms of climate change has, since the outset, (e.g. National Wind Power Ltd, 1992) been used as a method of framing the knowledge produced for the EIA Report with the intention of mobilizing people to accept projects (Johnston and Noakes 2005). This was demonstrated by Corvellec and Risberg (2007: 309) in their examination of how Swedish windfarm developers manage the planning consent process through meaning management by: 'contextualising the project' using co-texts such as legislation or climate change; 'ontologising its characteristics' making it seem real, through images, maps and carbon savings; and 'neutralizing any criticism' by producing knowledge that is difficult to refute. The new requirements (2014/52/EU), however, do bring some additional aspects to this assessment. Firstly, the assessment of potential climate change impacts upon the project introduces a stronger emphasis on risk assessment with the implication that this can be 'measured and weighed objectively' (Yearley, 2005:129). Secondly, the advice that carbon impacts should

be assessed using 'available environmental information and scientific knowledge' (2014/52/EU) is likely to introduce more computer modeling of impacts into the knowledge production process even though this may raise 'new obstacles to public understanding and participation' (Yearley, 1999:845).

Of interest to this research is whether the scientific rationale behind the climate impacts assessment may emphasise the applied science and over the civic-science paradigms of Cashmore's models and thus de-emphasise the role of public participation or whether there is empirical evidence to the contrary such as the use of multi-criteria decision analysis. However, climate change is complex, as Callison (2014) demonstrates in her work exploring how climate change comes to matter to American publics. For example, she found that 'facts' about climate science tend to be transformed into different meanings depending on the 'interpretative frameworks and epistemologies' (Ibid.:199) through which they are negotiated. For example, Inuit people have resisted "climate change" discourse despite being held up as an example of where unsustainable impacts are being felt and local observation of many symptomatic changes. Callison found that such changes are more likely to be negotiated through Traditional Knowledge and a human rights framework than sustainable development or environmental protection (Ibid.).

In terms of EIA knowledge production, advocating climate science as the 'truth' can be problematic as it conflicts with the professional norms of continual scrutiny and the inherent incompleteness of scientific knowledge (Callison, 2014). It has also been argued that climate change should be viewed as an intellectual resource around which identities and projects can take shape (Hulme, 2009) rather than scientific fact. Indeed, the public may raise questions about the 'supposed impartial methods of science used to diagnose the globe's (climate) problems' (Yearley, 2005:167). In light of previous discussions in this paper climate impacts assessment appears to resonate with the suggestion that science presents ideologies rather than truths (Gieryn, 1983) and that EIA provides a knowledge production framework within which to negotiate these ideologies (Cashmore, 2014).

Conclusions

This initial exploration of the epistemological assumptions within EIA knowledge production indicates the importance of understanding the potential role of applied and civic-science paradigms in relation to public participation and the social responses to a proposed project. As part of this PhD these ideas will be developed further through a critique of extant SEIAs using epistemological models, such as Cashmore's, to explore whether a more reflexive approach to SEIA influences participation levels and social responses, with the potential to advance EIA theory and practice.

References

Batel, Susana, Devine-Wright, Patrick and Tangeland, Torvald. (2013) 'Social acceptance of low carbon energy and associated infrastructures: A critical discussion.' *Energy Policy* 58 1-5

Becker, H and Vanclay, F. (2003) *The International Handbook of Social Impact Assessment. Conceptual and Methodological Advances*. Cheltenham (UK) and Northampton (USA), Edward Elgar.

Burr, V. (2015) *Social Constructionism*. Third edition. Hove, East Sussex; New York, NY: Routledge.

Callison, C (2014) *How Climate change comes to matter: the communal life of facts.* Durham, NC and London: Duke University Press.

Cashmore, Matthew. (2004) The role of science in environmental impact assessment: process and procedure versus purpose in the development of theory. *Environmental Impact Assessment Review* 24 403–426.

Chadwick, A. (2002) Socio-economic Impacts: Are They Still the Poor Relations in UK Environmental Statements?, *Journal of Environmental Planning and Management*, 45:1, 3-24.

Corvellec, H, and A. Risberg (2007) Sensegiving as mise-en-sens – The case of wind power development. *Scandinavian Journal of Management*, 23, 306-26.

European Union (2003) *Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC.*

European Union (2014) *Directive 2014/52/EU amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.*

Gieryn, T.F. (1983) Boundary-Work and the Demarcation of Science from Non-Science: Strains and Interests in Professional Ideologies of Scientists.' *American Sociological Review*, Vol. 48, No. 6 (Dec., 1983). Pp/781-795.

Glasson, J., Therivel, R. and Chadwick, A. (2012) *Introduction to Environmental Impact Assessment.* 4th edition. Routledge.

Hajer M, Wagenaar H. Introduction. In: Hajer M, Wagenaar H, editors. (2003) *Deliberative policy analysis: understanding governance in the network society.* Cambridge: Cambridge Univ. Press; p. 1–30.

Hulme, M. (2009). *Why We Disagree about Climate Change: Understanding Controversy, Inaction, and Opportunity*. Cambridge: Cambridge University Press.

Jasonoff, S., (2004) *Design on Nature: Science and Democracy in Europe and the United States.* Princeton: Princeton University Press.

Johnston, H, Noakes, J (2005) *Frames of Protest: Social Movements and the Framing Perspective.* The Rowman and Littlefield Publishing Group, Maryland, USA.

Kuhn, Thomas, S. (1977) *The Essential Tension: Selected Studies in Scientific Tradition and Change.* Chicago: University of Chicago Press.

National Windpower Ltd. (1992) *Trysglwyn Windfarm Environmental Statement*. Machynlleth, Wales: Dulas Engineering Ltd.

Newton-Smith, William H. (1981) *The Rationality of Science*. London: Rouledge and Kegan Paul.

Partidario, M.R. and Sheate, W.R. (2013) Knowledge brokerage - potential for increased capacities and shared power in impact assessment. *Environmental Impact Assessment Review.* Volume 39, February, pp. 26–36

Ross, H and Lane, M. in Dale, A, Taylor, N, Lane, M, editors (2001) *Social Assessment in Natural Resource Management Institutions. "Social Impact Assessment and Resource management at the Australian federal Level: Trapped in an epistemological corner."* CSIRO Publishing, Queensland, Australia.

Warren, C. and Birnie, R.(2009) 'Re-powering Scotland: Wind Farms and the 'Energy or Environment?' Debate' *Scottish Geographical Journal.* Vol. 125. No. 2, June, pp. 97-126.

Yearley, S., (1999) Computer Models and the Public's Understanding of Science: A Case-Study Analysis. *Social Studies of Science*, Vol. 29, No. 6 (Dec., 1999), pp. 845-866. Sage Publications Ltd.

Yearley, S., (2005) *Making Sense of Science: understanding the social study of science.* Fifth edition. California: Sage.