

Discussion

Comment on “How science makes environmental controversies worse”  
by Daniel Sarewitz, *Environmental Science and Policy*, 7, 385–403  
and “When Scientists politicise science: making sense of the  
controversy over *The Skeptical Environmentalist*” by  
Roger A. Pielke Jr., *Environmental Science and Policy*, 7, 405–417

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We applaud the initiative taken by the five authors in the October 2004 issue of *Environmental Science and Policy* to critically assess the widely held linear model of science and its naïve desire for truth-based policy. While the notion of science as a realm of facts distinctly separated from politics has been widely challenged during the past century, it is clear that science continues to be a prime source of political justification in environmental policy-making. As highlighted in the October 2004 issue, the most common contemporary response to environmental problems is to establish a scientific program ready to provide the proofs society needs to take action. This widespread scientization of environmental policy rests upon the assumption that sound science can provide an objective body of facts from which rational policy decisions can be drawn. Together the five authors in the October 2004 issue of *Environmental Science and Policy* challenge this simplistic understanding of science-policy interplay and call for a more constructive role for scientific expertise in the policy process. Instead of accepting the impossible task of reducing uncertainties and providing irrefutable truths in complex environmental controversies, the authors suggest that scientists should move beyond the political debate and focus on providing constructive solution space for environmental decision-making (Pielke, 2004; Sarewitz, 2004; Oreskes, 2004; Herrick, 2004). We agree that the linear model of science-policy interplay is sadly outdated and in need of

replacement, but fear that a renewed demarcation between the realms of facts and value conflicts rather will reinforce than challenge the logic that it rests upon. In order to move forward, we argue that it is necessary to instigate a reflexive and philosophically informed discussion about the situated and provisional nature of scientific advice in environmental policy-making among scientists themselves and those making use of scientific results.

### 1. Disciplinary divergence and plurality of knowledge claims

The idea of a linear relationship between science and policy where scientific knowledge functions as the rational basis for decision-making builds upon realist epistemology in which science, either through unbiased observation or universal reason, gains access to true representations of reality. This privileged position of scientists to mirror reality has been the prime source of epistemic authority in modern society and is the very root to the scientization of environmental policy during the past decades (Litfin, 1994). Already when the environment turned into a separate policy field in the 1960s, it was driven by and impregnated with science (Hedré, 1994). However, as effectively demonstrated by Sarewitz (2004), the notion of ‘science speaking truth to policy’ has in recent years been challenged by a plurality of knowledge claims. While the scientific experts called upon in the 1960s represented a rather limited number of disciplines, contemporary expert advisors

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embody a wide spectrum of research fields. It goes without saying that different disciplines generate different perspectives on the surrounding world, but it is too seldom acknowledged that disciplinary orientations embody different normative assumptions and divergent notions of good and relevant science. Hence, an environmental problem both looks and is inherently different when analysed from an ecological, chemical or economic perspective. As demonstrated by the Lomborg affair, the introduction of differing and sometimes opposing scientific perspectives to the public policy arena has laid the ground for a healthy and necessary public debate on the use and misuse of science in policy and the credibility of scientific facts. However, in this debate the linear model of science is seldom questioned as such. Instead, attention is drawn to the politicization of science and questions of how to demarcate between good and bad research. Hence, the idea of science as a provider of context independent truths has remained unchallenged.

We welcome the initiative taken by the authors in this special issue to bring the argument further and critically explore the fallacy of the linear model of science and the problems associated with naïve realism. As pointed out by Oreskes (2004), there is no use to wait around for an objective or absolute proof that can guide policy in a rational direction. The best science can offer is a temporary consensus on how to interpret certain evidence. The peer review system contributes to scientific consensus building by filtering out research that challenges existing modes of thought (Harrison, 2004). Hence, a peer review can only guarantee that scientific conclusions are based on science found to be acceptable within rather strict disciplinary, social and cultural constraints. Against this background, Herrick (2004) argues that the political call for objective science-based analyses of policy options is both theoretically uninformed and naïve. As convincingly demonstrated in these papers, scientific inquiry is a highly interpretative exercise open for continued revision and re-examination. It is also deeply embedded in the social, cultural and political context in which it operates and any calls for absolute or atemporal results will therefore be in vain. However, when Sarewitz (2004) suggests that the political use of science as provider of truth in environmental policy-making best is managed through a quiet period for scientific debate during which political controversies can be overtly discussed, we believe that the golden opportunity to fully explore the implications of a socially determined scientific practice is missed. Although Sarewitz highlights the diversity of value commitments and normative frameworks underpinning disciplinary inquiry, the traditional demarcation between production of facts and value conflicts is still somehow called for. Also, Pielke (2004) indirectly reinforces the logic of the linear model by calling for a demarcation between political advocacy and scientific inquiry that will allow science to provide independent knowledge useful to policy development. By emphasizing the politicization of science

rather than addressing the politically entrenched nature of science as such, we fear that the two authors indirectly reproduce the model that they set out to criticize.

## 2. Towards reflexive and socially accountable knowledge

During the past decades, the privileged position of science has been widely challenged with reference to the social context in which all knowledge is produced. Studies of scientific knowledge in the making have suggested that scientists do not only depend upon their context for funding, material resources and institutional affiliation, but also for the social norms and cultural forms underpinning scientific inquiry (Rouse, 1999). Taking the socio-material context of scientific knowledge production into account, it has been pointed out that disinterested representations of reality “out there” are unattainable. Instead, truths represent socially determined or “situated knowledge” (Haraway, 1999) and are, therefore, inevitably provisional. While science traditionally has been distinguished from other knowledge producing activities by its unique methods for empirical evidence, logical consistency and critical scrutiny, the contingent and negotiated character of “good science” is today increasingly highlighted. As suggested by Gieryn (1995), the cultural authority of science depends more on a pragmatic demarcation of science from non-science than on its access to independent facts. Whatever ends up inside or outside science is the result of a constant boundary-work exercised by scientists themselves and those making use of science (Gieryn, 1995). The boundary-work employed at the interface of science and politics is particularly delicate. While scientists have interest in protecting their claim to authority over fact making by establishing a clear demarcation between facts and value preferences, their cultural legitimation also hinges on the usefulness of scientific results in decision-making. The challenge for scientists is, hence, to keep close to politics without risking the authority associated with their independence. Politicians and policy-makers on the other hand need to bring science close enough in order to legitimize political choices, but they also need to institute a clear boundary in order to avoid appearing technocratic and expert-driven (Gieryn, 1995; Jasanoff, 1990).

If the boundary between science and politics represents a constantly negotiated contract between scientists and decision-makers, there is no real or clear-cut demarcation to fall back on when reinstating the independent authority of science in environmental policy-making. Instead, the science–policy interface represents a hybrid, or mutually constructed arena, where facts about the natural world are shaped by the social relations between scientists and those whom they advise (Shackley and Wynne, 1996; Jasanoff and Wynne, 1998; Miller and Edwards, 2001). This epistemological relativism is often mistaken for ontological

relativism and is, therefore, commonly refuted with the argument that it denies the reality of environmental problems and turns everything into a matter of politics (Jones, 2002). While some constructivist scholars indeed forward this extreme position, a more common and fruitful approach is to address the social limits of scientific truth speaking and the plurality of knowledge claims. To acknowledge the provisional nature of scientific advice in environmental policy-making is to open up for a reflexive discussion about the epistemological and cultural assumptions underpinning the linear model of science. We believe that it is central to engage scientists in this critical self-confrontation in order to create a sense of academic responsibility for how scientific results are represented and used in the policy process, and to build a more socially accountable science. Instead of building public trust on a faulty claim that more research will reduce all scientific uncertainties surrounding global environmental issues, Nowotny et al. (2002) have suggested that a “socially robust science” initiates a public discussion about the limits to scientific inquiry and hence opens up for social monitoring and scrutiny of scientific results. To challenge rather than to reinstitute the demarcation between science and politics should, hence, be seen as the way towards a more socially accountable and reflexive scientization (Beck, 1992) of environmental policy.

However, in order to initiate this necessary self-reflection within the larger scientific community we acknowledge that the present communication gap between natural scientists and scholars engaged in science studies must be bridged. According to our understanding, the majority of scientists are serious, hard working and honest — determined to carry out good research. In most academic environments, good science is still conceived in realist terms and scientists are hence trained and expected to generate an objective representation of the natural world. In this dominant research paradigm, constructivist representations of science as a social and value-laden activity tend to be conceived as accusations of misconduct or bad science rather than constructive critique. Unfortunately, much of the science study literature contributes to this misunderstanding by using a conceptual framework that is often difficult to access for scholars with other disciplinary orientations. The interest in the social context and cultural factors influencing scientific practice can, hence, easily be misunderstood as allegations that scientists deliberately construct or forge their research results, a proposition that makes the communication gap even more difficult to bridge. We consequently believe that an inter-disciplinary dialogue aimed at greater epistemological and inter-paradigmatic

understanding is a crucial component in the reflexive scientization we hereby call for.

### Acknowledgement

Our research is funded by the Mistra Climate Policy Research Programme (CLIPORE) and the Graninge Foundation, which hereby is acknowledged.

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