



## Perspectives

# How can social science research become more influential in energy transitions?



Paul C. Stern

Social and Environmental Research Institute, United States

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## ABSTRACT

This paper explores the broad question of how non-economic social science can become more influential in energy transitions by influencing policy or by other means. It distinguishes “pure” social science energy research (SSER) that seeks fundamental understanding of human interactions with energy systems and which is not appropriately judged by practical influence from applied SSER. Several streams of applied SSER investigate topics that are self-evidently important to energy transitions and can have impact without referencing energy units, but SSER on important topics such as household energy consumption, for which the outcome variables are inherently measured in energy units, needs to put energy first to have practical impact. SSER priorities in such areas should be guided by two principles: selecting research topics (1) with large potential for change in energy terms and (2) for which social science concepts can add explanatory value beyond what can be achieved by concepts from other fields. For various reasons, SSER in this area has typically ignored principle 1. Following it is necessary but not sufficient for greater practical influence. The paper suggests strategies for achieving such influence.

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## 1. Introduction

Cooper [1] argues that research on energy topics derived from the social sciences outside of economics (hereafter, “social science energy research” or SSER) has been less influential on policy than it could be, proposes an explanation for this shortfall of influence, and suggests a strategy for making social science energy research more influential in the domain of energy policy. All these ideas deserve careful consideration and discussion within the SSER community. I hope the following thoughts help advance this discussion.

### 1.1. Purposes of social science energy research

Cooper’s paper focuses on one purpose for research: “policy impact,” by which he appears to mean influence on decisions by governments and on the analyses they use to inform those decisions. This focus is important, and it is understandable given the author’s years in a public policy environment (the UK Department for Energy and Climate Change), which gave him first-hand experience with what he sees as the failure of social science research to be influential. However, policy impact is only one form of influence.

Cooper’s paper raises the larger issue of the influence of SSER in energy transitions, and it is to that issue that I respond here.

It is important to recognize at the outset that SSER is a branch of what I have called the science of human–environment interactions [2], and that, like other instances of this broader science, it is inherently interdisciplinary—both across the social sciences and between the social and physical sciences (and in some cases, engineering, communications, and other fields). This recognition is evident in Cooper’s advocacy of the use of units of measurement that combine the physical and social and in several other comments in this section [3–7]. As some of these comments have also pointed out, this inherent characteristic of the field creates intellectual challenges, both for individuals seeking to develop careers in the field [4], who must develop expertise that goes beyond any home discipline from which they emerge, and for actually carrying out research, which often requires forming interdisciplinary research teams that need to overcome differences in language and modes of thinking to be effective [3,7]. Such challenges can be a cause of failure to be influential, although they can also generate highly promising research questions, as suggested by Stephenson’s [7] account of a plausible interdisciplinary conversation about the adoption of photovoltaic energy systems.

Serious attention needs to be paid within academic institutions to developing better institutional forms for training and for interdisciplinary research practice. Increasingly, some universities are

E-mail address: [ps Stern@nas.edu](mailto:ps Stern@nas.edu)

seeking to meet these challenges with interdisciplinary training programs and research institutes devoted to energy and related topics such as climate change. But practitioners of SSER must seek productive ways forward under current conditions, even if they are not in friendly institutional environments.

I turn, then, to the challenge of achieving influence for SSER under current institutional conditions, beginning by differentiating several purposes of SSER and types of influence it might have. First, there is the distinction between what is sometimes called “pure,” or fundamental, and “applied” science (for more detailed discussion in the energy context, see Stern et al. [8]). Pure SSER aims to illuminate fundamental relationships between energy and society, such as how societal changes affect energy systems and vice versa. It is conducted at many spatial and temporal scales. At larger scales, it includes historical analyses of past energy transitions and of the interactions between long-term social transformations and energy systems (e.g., suburbanization in developed countries and increased dependence on private automobiles and therefore on liquid fossil fuels). At smaller social scales, it includes studies of how individuals and households think about and act on various energy issues, as consumers and as citizens [9]. As with any fundamental science, its value cannot be judged primarily by its influence on policy. Fundamental research on energy-society relationships may influence policy indirectly, for example, by informing policy design, but it must be evaluated primarily on its contribution to understanding.

“Applied” SSER aims to contribute to change in the systems it studies—sometimes by influencing policy, that is, decisions by governmental entities, and sometimes via other routes, such as by informing or influencing energy producers, consumers, trade associations, environmental groups, and other participants in energy systems. Because there is such a wide range of legitimate purposes of social science energy research, both pure and applied, I find Cooper’s comparison between articles in *Energy Research & Social Science* and articles in *Energy Policy*, though intriguing, a bit unfair. Like some other contributors to this section, I do not see the two journals as having the same objectives. *Energy Research & Social Science* covers a wider range of research objectives and a broader set of research purposes than only influencing governments’ decisions. Below, I divide the opportunities for influence into two categories: research topics for which in my view physical units are not central, and research topics for which they are.

## 1.2. When physical units aren’t central

Contrary to Cooper’s argument, multiple traditions of social science energy research can make useful contributions to policy and to informing energy transitions without needing to reference physical energy units in any detail. A few examples illustrate.

### 1.2.1. Public acceptance of energy technologies

Issues of public acceptance often arise with energy technologies, particularly emerging ones (e.g., [10,11,12,13]). Too often, the need for social science research on public acceptance is not recognized until a technology begins to face organized public opposition. This fact underlines the need for social science research on public acceptance at early stages of technology development. Such research can speak loudly to policy without referencing physical units of measurement.

### 1.2.2. Social impacts of energy developments

Energy transitions often have social effects, such as on public health, economic inequality, job opportunities, social stability, and even international relations. The effects of nuclear power provide a classic example. More recently, impact studies have begun on the development of shale gas resources using hydraulic fracturing tech-

nology [13]. Social science research can illuminate the benefits and risks of such developments in ways that inform both governments and other actors in energy, but reference to energy units is rarely necessary or sufficient to achieve influence.

### 1.2.3. Improving societal decision-making processes in the energy domain

During energy system transitions, social science research on decision-making processes can inform efforts to make choices in ways that adhere to democratic principles, meet the needs of varied social groups, and address conflicts more effectively and perhaps with less social friction than would otherwise be experienced (e.g. NRC [14,15]). Benefits may flow both to governmental entities and to other participants in decision making. Again, this is not a matter of using physical units.

### 1.2.4. Achieving international agreements on energy and climate

Effective international agreements on energy transitions have been notoriously difficult to reach. Social science research has helped clarify the difficulties and has suggested strategies to promote transitions at the international level (e.g., [16,17]). The importance of the problem is so self-evident that promising policy possibilities need not estimate potential effects in physical units to be taken seriously.

Such examples have in common that they focus on energy issues that are easily recognized as important for transitions, even without quantifying impact in physical units. They illustrate some of the ways that energy transitions could be facilitated by appropriate engagement and use of SSER, without reference to such units. Cooper mentions several such examples from the UK experience. I agree with the argument of [3] that greater reference to physical units in such research will not necessarily make it more successful at getting its insights used in policy. I suspect that the barriers to achieving influence for such research lie more in the policy communities and their associated political and economic interest groups, which too often assume that if a technology works and if economic analysis indicates that it would be cost-beneficial, it will therefore be adopted. Too often they do not realize until the expected progress is blocked by some sort of social reality that there are other important determinants of transition than the technical and economic. My impression is that when progress has been made in integrating social science in these transition processes, it has tended to depend on influential people in the policy community who can recall from past personal experience the dangers of failing to consider issues such as social acceptance, impacts, and inclusive decision processes early on.

It is important to recognize that governments are not the only significant actors in energy transitions. Non-governmental actors can influence public policy from the outside, as [3] note, and they can also influence energy transitions by acting outside governments. Social science can potentially influence energy transitions by speaking to non-governmental actors—a route to influence that is especially important when public policy is paralyzed, as it often has been in the USA. An important body of social science energy research on non-governmental initiatives builds on Ostrom’s [18] seminal work on common-pool resource management and aims to understand bottom-up efforts to promote energy transitions. This work includes research aimed at influencing individuals and households directly by providing information in more readily usable forms (e.g., [19]) or indirectly through the actions of consumer-facing companies [20]. It includes work on how organizations both within and outside governments can promote such change without altering existing policy regimes (e.g., [21,22,23]). It also includes studies of efforts within industries or by associations of non-governmental entities (e.g., [23,24]), and international efforts

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