A new framework for assessing energy systems

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Introduction

During the week of May 27-June 1, 2012, researchers and practitioners from all over the world gathered to discuss the role of impact assessment in energy decision-making. At the heart of the matter is the recognition that impact assessment has the "ability to address in a single analysis the environmental, social and health concerns, among others that could occur from our choices in energy sources" (IAIA 2012, p. 5).

When considering the role of impact assessment in shaping society's energy future, one question that bears further exploration is how both the process of undertaking the assessment, as well as the ultimate decisions, will help rewrite society's relationship to energy in a positive manner and foster a more positive shared sense of humanity. In other words, how do we, both individually and collectively, personally and professionally, move beyond the technical and economic concerns to focus far more closely on the social and ethical implications of energy strategy (Lovins 1976, Nader 2004)? Addressing these questions above is no easy matter, but ignoring them invites failure.

This article explores some aspects of the relationship between energy and society by drawing from the soft-energy path and more broadly from studies of socio-technical and socio-ecological systems in order to propose a basic package of eleven criteria for assessment that simultaneously inform energy decision-making and attempt to promote social change. This suite of criteria builds complements the theoretical and practical work of resilience thinking and transition management (Walker and Salt 2006, Loorbach 2007), both of which have are becoming increasingly recognized in impact assessment (Slootweg and Jones 2011, e.g. Gibson 2011b). The criteria could be applied while using deliberative democracy methods in decision-making. The eleven criteria are elaborated in the four sections that follow.

1 - Formulating the problem

In order to discuss the link between energy and society it is necessary to be more explicit concerning how the energy problem is framed. Robinson (1982) describes three general framings to defining the 'energy problem': (1) developing new supplies and conservation measures to reduce waste and meet the expanding energy demands of a dynamic society; (2) addressing the increasingly intolerable social, environmental, and ecological costs of continued energy use expansion by promoting drastic cuts, voluntary choice, cultural change and progressive legislation; and (3), one manifestation of a fundamental crisis that threatens the very survival of industrialized society and requires full course change. The lines between these three framings are blurry, and to a certain extent all three problem framings necessarily imply social change (although in qualitatively different manners).

Problem definition is strongly influenced by values, ethics and power relations (Checkland 1999, Flood and Carson 1993, ch. 3, Midgley 2000 ch. 3, Franklin 1990), and these influences are rarely adequately addressed for energy problems (Nader 2004, Hiesinger 2002). Instead, worldviews often become expressed through seemingly neutral terms, such as 'efficiency' (Schumacher 1973). To this end, the importance of situating oneself within a particular problem framing is that it helps make the deeper worldviews underlying the framing more explicit, as reveals to a certain extent the power dynamics at play. Ideally, framing the problem is an important step in fostering constructive dialogue and a shared understanding of goals (Bardwell 1991, Kay 2008). To this end, explicit problem framing is proposed as a first criterion in Table 1.

Table 1 - Worldviews and problem framing criterion

1 - Acknowledge problem framing and underlying worldviews Acknowledge that problem framing is a normative and political exercise and often represents deeper worldviews. Be explicit about problem framing, both with regard to the terms of reference, as well as how the specific assessment-related problem framing relates to our deeper shared (or contested) understanding of the energy 'problem'.

Generally speaking, it appears that the second framing is becoming increasingly formally recognized although most discourse actions, both individually and collectively, tend to favour the first framing (e.g. increasing supply and reducing energy costs), whereas in the long term the third framing needs more serious consideration. This paper must be understood as being situated within a premise that deeper social change is necessary (e.g. Bellamy-Foster 2009, Haberl et al. 2011).

2 - Appropriate technologies

"The most important, difficult, and neglected questions of energy strategy are not mainly technical or economic but rather social and ethical." (Lovins 1976)

In the energy literature, one of the most recognized approaches to linking energy with society is the soft energy path, which was proposed by Amory Lovins in the 1970s (Lovins 1976, Lovins 1977), and drew from the appropriate technology movement that arose during the previous decade (c.f. Schumacher 1973, Winner 1986, Clarke and Clarke 1972). Lovins was careful to frame his arguments within the discourse of cost and efficiency (Winner 1986, ch 5), in other words within the first problem framing described above. However even a cursory analysis of Lovins' work indicate he was calling for substantial social change, and offered a different worldview regarding the nature of social welfare (Robinson 1982).

In developing the soft energy path, Lovins (1977, ch 2) started with the premise that the purpose of energy planning was promoting and maintaining social welfare, and that perhaps the true 'energy problem' was how to "meet social goals elegantly with minimum of energy and maintaining social fabric". Equally important, Lovins (1977, ch 2) argued that having too much energy too fast was potentially more problematic than too little energy too late; of which a geopolitical variant of this proposition is the 'resource curse' (Moore Lappe 2011, Bellamy-Foster 2009). Moving beyond simply measuring

efficiency, Lovins (1977, ch 1) argued it is necessary to discuss the utility: whether what was done was worth doing.

With regards to energy systems planning, Lovins (1977, ch 2) proposed five desirable qualities of energy systems, namely that they should be: based on renewable energy flows (income rather than capital); diverse, with each one designed for maximum effectiveness; flexible and low technology so they can be understood and used without esoteric skills; and matched in scale and in geographic distribution to end-use needs; and matched in energy quality to end-use needs. Many of these characteristics are drawn directly from the appropriate technology movement (e.g. Clarke and Clarke 1972, Schumacher 1973). Beyond the five characteristics provided above, a preliminary set of key insights from the soft energy path are provided below as a second category of criteria provided in Table 2:

Table 2 - Soft energy and appropriate technology criteria

2 - Focus on services, not supply Recognize that energy is a means for social ends, and is valued not for itself, but for the services that it provides (e.g. comfortable rooms, light). Energy policy is a vehicle for meeting end-use demands for those services in the most elegant and non-violent manner possible. Be explicit about means and ends.
3 - Promote end-use matching When energy is required to provide a service, match the scale and quality of your energy supply to the scale and quality of its final use.
4 - Develop energy bridges Focus on energy systems as being a constant bridge to more sustainable social structures, recognizing there is no ultimate energy end state. Bridging mechanisms should be minimally disruptive but will require societal and technical change and require seeking and developing means of production that do not (or minimally) rely on fossil fuels.
5 - Use energy policy to catalyze broader change in social values Recognize that energy strategy has implications far beyond energy supply and demand, and rather affects a wide variety of sector (e.g. public health, food sovereignty). Design energy systems as a means of re-patterning society (e.g. promoting urban agriculture, fostering social learning) in a positive manner.

3 - Energy technologies, politics, and society

"We don't know where we're going, but we're on our way." (Winner 1986, p 176)

Approaching energy planning through the lens of the soft energy path and appropriate technologies leads into a deeper discussion of the politics of energy technologies. For those who acknowledge the political nature of technologies, many adopt the view that what matters is not the technology itself, but rather the social or economic system in which the technology is embedded (Bellamy-Foster 2009). Technology becomes a means to an end. Without discounting this view, Winner (1986, ch 2) argues that certain technologies may also be inherently political because they are strongly compatible with particular kinds of political relationships, or they require the creation and maintenance of a particular set of social conditions.

Whether inherently political, or based upon social and economic structures, most energy technologies have tremendous political (and geopolitical) implications. An oft-cited example of energy politics is nuclear power, which has been criticized for placing limits on individual freedom in order to ensure against terrorist attacks, and is closely coupled

with centralized power generation and technological lock-in (Nader and Milleron 1979, Winner 1986, ch 2, Hiesinger 2002, Winfield et al. 2010). The very notion of energy regimes (Loorbach and kemp 2008, Verbong and Geels 2010) implies a relationship between energy technologies and politics.

The choice of technologies and social structuring is deeply linked to the question of worldviews. For example, in a limitless world, the question of the proper ordering of society does not matter much (Winner 1986, ch 2). Likewise, there is often an underlying belief that technologies (especially information and communication technologies) are inherently liberating, although this belief has been challenged on various fronts (Franklin 1990, van der Ploeg 2008). A preliminary set of criteria relating energy technologies to politics and society is presented in Table 3.

Table 3 - Criteria relating to the politics of technology

6 - Prioritize the people and the goods will look after themselves Favour energy technologies and decision-making processes that promote democracy and citizen engagement. Prioritize basic virtues, rights and the public good (e.g. liberty, justice, equality, fairness, self-realization) while recognizing the technical characteristics (efficiency, cost) will adjust accordingly.
7 - Promote reciprocity Promote energy technologies that foster greater reciprocity so as to allow people to become more involved in, and aware of, the production, consumption and operation of their energy technologies.
8 - Recognize the cumulative and emergent consequences of mass adoption Recognize that many of the important benefits and drawbacks of energy technologies emerge during mass adoption. To the extent possible, anticipate such cumulative and emergent effects and plan accordingly.
9 - Avoid technological lock-in Favour energy technologies (and energy regimes) that maintain and improve the ability of future generations to determine their own desirable socio-technical structure.

4 - Less microscopes, more mirrors

The final set of criteria relates to the reflexive and social learning components of assessment. In concluding their book on strategic environmental assessment, Therivel and Partidario (2000) issued an interesting and important challenge to future assessment practice: the basic act of carrying out a strategic environmental assessment consumes resources, and it is important to ensure a positive return on investment of the assessment. At the very least the assessment should pay for itself in terms of resources saved (Therivel and Partidario 2000).

The basis of Therivel and Partidario's challenge is that it reflects back upon the assessment process itself, in this case highlighting that everything has a cost. Their challenge may be more generalized as an opportunity to allow for self-reflection, surprise, and transformative learning during the assessment. Under the premise that society ultimately must rewrite its relationship to energy, then if the assessment process itself does not transform worldviews, we must seriously question what will. Table 4 highlights two criteria related to the assessment process as a means of promoting transformative learning.

Table 4 - Criteria for the assessment process as transformative learning

10 - Promote transformative decision-making processes Promote an assessment process that allows for personal self-reflection and transformative learning. Provide an opportunity for reformulating the energy 'problem' at the end of the assessment. To the extent possible, favour an assessment process that encourages all those involved (both formally and informally) an opportunity to change their own actions so as to better reflect our understanding of the problems we face.
11 - Favour energy systems that promote responsibility Design energy systems that promote intrinsic responsibility, such that feedback about the consequences of decision-making return to the decision-makers in an appropriate manner. Encourage the fair sharing of benefits and risks of decisions resulting from the assessment process, including among the decision-makers.

Conclusion – More revolution than evolution

The criteria developed above place high expectations on the potential for impact assessment processes to foster deeper social change and broaden the terms of reference beyond what is generally desired for an expedient process. Furthermore, the criteria developed herein may be applied in a wide range of impact assessments (both formal and informal, comprehensive or modest) with a primary focus on sustainability assessments (Winfield et al. 2010, Gibson 2011a, Gaudreau and Gibson 2010). Even within the confines of more traditional forms of assessment (and more limited terms of reference) (e.g. Gibson 2011a, JRP 2009), there is ideally the possibility to foster deeper deliberation and dialogue regarding where we all wish to go as a society.

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