

## Rethinking Energy Efficiency: The Role of Sociology in Illuminating Humane Dimensions

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### Abstract:

*Since inception sociology has investigated the societal impact of complex interplays between utilization & exploitation of natural resources, development & transition of technologies generating and distributing energy in economic (mostly industrial) and social systems. Issues related to resource depletion, climate change, national security or energy consumption at large is viewed as more scientific rather than social issue. For devising any effective policy interventions. It is important to grasp that energy consumption does not happen in isolation.*

*Energy consumption by individuals or communities can be viewed as social activity. Sociologically perceiving energy consumption opens a set of questions linked with its social dynamics and social organization of energy-conserving practices. An effort is made to bring together scattered studies that aim to explore nuances involved in exploring sociological linkages (along with related issues) that impact energy behaviour, energy conservation knowledge & practices. The study attempts to enquire social dynamics & social organization of energy conserving practices and social change as sociologically driven debate can suggest policy gaps related to humane dimensions of energy efficiency. This Inquiry allows to identify and explore alternate viewpoints for understanding socio-technological changes concerned with energy policy framing/interventions, Sociology presents promising grounds for contributing to energy' and climate policy. Instead of following conventional advisor's role, sociological investigation in this domain opens up avenues for further critical research stances.*

**Keywords:** Social Dynamics, Social Organization, Epistemology, Energy Efficiency, Energy Conservation.

### Introduction

Energy related practices and theories are mainly anchored in domain of science and technology while energy policies are debated more in domain sociology and politics. Majority of discourses on energy policies in India are taking shift towards considering energy consumption as a problematic. The crude oil shortage and crisis experienced by world during 70s attracted attention of scholars from political science, economy and sociology to investigate questions linked to energy production, distribution and consumption. Among such questions the main focus was made on reduction of dependency on fossil based fuel consumption<sup>2</sup>. And this pressure created long term anxieties internationally about depletion of non-renewable energy resources. This resulted into development of fears and forecasts related to oil consumption by economies and their reserve management. This scenario after 70s presents shift in energy problem and environmental concern related to conservation of energy emerged during 80s and continuing till date. This holds sociological significance to understand global and national conditions energy conservation policies.

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<sup>2</sup> Simon Guy And Elizabeth Shove, A Sociology Of Energy, Buildings, And The Environment: Constructing Knowledge, Designing Practice (2009).

In any domain, politics or economy, depletion of energy resources and linkages with international relation, national security or climate change the energy generation, distribution and consumption is defined at through the lenses of science and technology rather than viewing it as social challenge. Application of sociological lenses provides novel understanding about theoretical frameworks, process of technology, global relations of states and implication scientific practice. Sociological perceptions allow energy policy framers and researchers to develop uniform vision of social change driven by energy conservation discourse. For this purpose, one has to grasp socio-dynamics of energy consumption along with social organization energy conservation measures and practices.

### **Energy Efficiency and Sociology**

The term environment is often linked with social movements in domain sociology that suggest development of new kind belief and value systems through and after popular environmental campaigns and debates. This debates regarding alignment and non-alignment of life worlds with energy conservation<sup>3</sup> and uncertainty of science of climate change<sup>4</sup> can be traced from classical sociologists like Marx Weber and Emile Durkheim.

The term environment in sociology is appropriated in ways that it reflects prior dispositions along with theoretical orientations. Social constructivists presents contrasting views than realists and there also exists non common consensus among social environmental scholars about specific methodology and approach<sup>5</sup>. Similarly, not all climate change or environmental themes has sociological significance. Majority of sociological studies related to energy, climate and environment lacks in micro level understanding daily mundane issues related to energy consumption.

The study grounds itself into sociology of energy where energy is perceived as key cultural variable. This allows to recognize that societies needs energy conversation technologies in order to survive. Energy available to a given culture is responsibility of science, innovation and technological ecosystems while on other side, energy conversion differentials has significant influence over power dynamics in society. Clearly, innovation and technological choices are determined politically, economically and culturally<sup>6</sup>. Every phase of human history from coal, to steam engine, to electricity and further, carries evidences of development of technologies for exploitation of nature and shift in historical socio-cultural conditions<sup>7</sup> due to that.

At macro level, sociological interpretation has remained influential in terms viewing materialist foundation that tend invokes functional explanations. If social organization of energy conservation is mostly driven by basic human needs. Present efforts at policy level still observe to be clingy with such understanding where investments are made to identify and distribute flows of energy presenting inequalities in energy production and consumption. Union of energy technologies and such inequalities needs to be thought through established institution and policy paradigms that can incorporate scientific energy efficiency knowledge.

Talking about daily energy consumption practices, energy and climate experts are observed to be interested in relationship between usage of energy and organization daily life. For instance, increase in people longingness for comfort increases energy demand. Such demand or intensity arising from “taken-for-granted” daily routines require detailed sociological explorations.

<sup>3</sup> Luke Martell, *Ecology And Society: An Introduction* (2003).

<sup>4</sup> Ulrich Beck, Scott Lash, And Brian Wynne: *Risk Society-Towards A New Modernity* (1992).

<sup>5</sup> Gail Cooper, *Air-conditioning America: engineers and the controlled environment, 1900-1960.* (2002).

<sup>6</sup> Loren Lutzenhiser, "Social structure, culture, and technology: Modelling the driving forces of household energy consumption." *Environmentally significant consumption: Research directions* 129 (1997).

<sup>7</sup> Marshall Sahlins, "Energy and Society: The Relation between Energy, Social Change, and Economic Development." (1956): 1141-1144.

However, management of energy consumption in such manner has remained low key policy issue in India. Ignorance of people and policy makers to link daily routines with carbon emission has remained under-understood. For instance, there exists striking association with usage of boiling kettles with climate change. Such linkages have not captured attention of policy framers and public at large. This scenario presents an urge for scientific evaluation of energy consumption practices and policy by placing it on top of national development agenda. In daily routines, invisibility of energy consumption is much common. To view this reality one as to made aware about every “thing” whether its chair, table, aluminium frame that is seen has consumed energy<sup>8</sup>. A noteworthy indicator for such ignorance is observed in having tangible symbol. In general, concern related to environment and climate are organized around symbols related to chimneys, panda, whale, ozone layer etc. that do not capture focus on daily harm done due to energy consumption. Social movements against nuclear power plants, climate change, nature conservation etc. has made difficult to view energy consumption as daily activity. On other side, agencies and people advocating simple, eco-friendly lifestyles are still dependent on electricity. There exists no doubt about vested interests in maintaining industry and infrastructure and societal expectations of modern normal life presuming on an extensive and complex energy systems. For any of aforementioned reasons, energy consumption in daily lives is not able to make its mark among popular concern and sociological investigations. This becomes pivotal reason for exclusion of interest from government, non-government and social movements regarding looking energy consumption sociological dimension.

It is widely known that availability of technologies cannot be equated with application of technologies. The current state of affairs, compounded by an increasing recognition of the urgent need to reduce carbon dioxide emissions, has directed scrutiny towards the "non-technical factors" that are perceived to influence energy consumption and impede the actualization of established technical possibilities. Social researcher are constantly undertaking studies aiming to improve efficacy of energy saving campaigns, assess their impact and inform insights for future trends of energy consumption<sup>9</sup>.

Such studies raise questions or attempts to answer questions like why people won't save energy? what are socio-technical barriers to energy efficiency? And how can one overcome them? Etc. sociologists can assume two aspects of such studies where proven energy saving technologies are confronted by reluctant social forces. These social force have valued role in terms of guiding policies and practices if studied systematically.

Evolution of the energy problem from sociologists point of view, variety of national and international research systems on culture and climate change are expected to diverse forms of energy policy framing expertise. A standardized methodologies and development agendas can foster growth of a well synchronized epistemic expert groups of energy researchers. Such expert groups can deal with required abstract knowledge for production of theories and development & management of inter-disciplinary models<sup>10</sup>. This abstract knowledge circulated through popular standardized publications that constitute accepted advisory and guidance. Related theories of technology transfer implicitly support the relevance and legitimacy of generalized research and development. The problem of implementation may have focus on opportunities for adoption of energy saving strategies that are standardized, individualized or economically determined appropriately located in specific social contexts. Energy saving practices and technologies across world presents that they are selectively

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<sup>8</sup> Steven Yearley, *The green case (Routledge revivals): a sociology of environmental issues, arguments and politics* (2014).

<sup>9</sup> Kenneth Gillingham, Richard Newell, and Karen Palmer. *Energy efficiency economics and policy*. No. w15031. National bureau of economic research (2009).

<sup>10</sup> Cornelis Disco, *Arie Rip, and Barend Van der Meulen. "Technical innovation and the universities: divisions of labour in cosmopolitan technical regimes."* SOC. SCI. INFO. 31.3 (1992): 465-507.

appropriated with social contexts. This makes it clear that technical strategies may or may not make sense for variety of reasons and its adoption depends on the competing perspectives (sometimes) and priorities of entire network of organizational actors. Whatever else, the picture is certainly not one in which proven knowledge is seamlessly transferred from research to practice.

### **What kinds of knowledge did these shared methodologies generate?**

The interplay between scientific and practical knowledge in the realm of energy is a highly intricate subject matter. This complexity arises due to the contested nature of energy itself. A crucial aspect in this context is the visibility of energy savings, as one must possess a means of rendering them perceptible. Knowledge of energy depend on the measurement methods applied and is problematic. Linkages among research and practice needs explicit consideration. Putting this at pivot one has to review number of global efforts made to exchange of information on innovative cost-effective energy saving technologies<sup>11</sup>. The expert sociologist posits that these initiatives operate under the assumption that it is both feasible and imperative to combine the lessons gleaned from energy efficiency practices observed in various countries. Programmes related to technology transfer may help to eloquent fashionable ideas about the dynamics of knowledge abstraction and appropriation. This raises a question related to processes and philosophy of technology transfer along with relationship between standardized technological measures among variety of contexts in which they are produced and put into practice.

### **Sociology of Scientific Knowledge and Energy Policies**

Construction of energy knowledge can be grasped from issues addressed by the expert sociologists related to the construction of conventions surrounding knowledge acquisition pertaining to energy use. It is contended that the methods employed for measurement play a pivotal role in shaping our understanding of the subject itself. Subsequently, an exploration of diverse strategies for acquiring novel insights into energy efficiency is required to be undertaken. This requires a detailed examination of methods that involve abstracting knowledge, drawing upon research focused on passive energy designs. Moreover, alternative approaches to knowledge building are elucidated through of case studies. By replicating existing knowledge, a comprehensive understanding of energy-related phenomena can be achieved. The subsequent sections considers current theories and assumptions about technology transfer and the characteristics of building science and building practice.

One of the significant consequences of such changes is rooted in breaking down of the traditional practices and infrastructure planning that can forecast demand growth can be matched with increasing infrastructure capacity. Development of infrastructure, in present days are financially and politically challenging task for policy framers and planners. This requires more attention on demand management strategies with lesser investment. Such focus may develop new style of planning processes although practical implementation processes remains contested.

The major dimension of debates surrounded around demand management strategies within industry and urban area are technological and innovation among technology developing and new institutions. On one hand, there exists institutions with new technologies form monitoring and control users' demand that can managed more effectively. The planning processes should offer forecasting and prevention of high tech and scientific replacement to traditional paradigm. A meticulous analysis of projects and programmes undertaken by experts reveals their commitment to delivering substantial outcomes, aligning with national development agendas.

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<sup>11</sup>Ali Hasanbeigi, and Lynn Price. "A review of energy use and energy efficiency technologies for the textile industry." *REN. SUS. REV.* 16.6 (2012): 3648-3665.

The question arises as to how evaluations of technical potential ventured into the realm of research and science policy. A comparative examination of research landscapes indicates that the relative influence exerted by the government, academia, and industry has tangible ramifications for determining technical challenges and priorities. Consequently, diverse research strategies emerged. It is not merely a matter of academics vying for resources to pursue their own scientific interests, nor does increased industry involvement inevitably reshape interpretations of relevance. However, the extent to which agenda-setting processes either disregarded or were dominated by an appreciation of the feasible actions and potential in the tangible world profoundly shaped the trajectory and nature of technical investigation. This interplay had a pervasive impact.

**Conclusion:**

Sociological examinations of prominent energy and environmental controversies, such as those surrounding genetically modified organisms, the disposal of radioactive waste, or the management of water pollution, also delve into matters of knowledge, policy, and practice. However, the concerns that occupy scholars in these fields, such as public trust issues or the global politics surrounding environmental agenda setting are not particularly relevant when studying everyday energy efficiency technologies or the inconspicuous processes involved in building construction. While established concepts of knowledge, technology, and social change can be applied, they often require adjustments or complete reconfigurations to adequately comprehend events within this discreet realm of environmental and energy policy. To locate appropriate resources, attention needs to be re-directed towards the sociology of science and technology. Ideas pertaining to the entrenchment of new technologies or significant turning points in design history prove to be valuable tools for analysing individual devices and objects. In order to conceptualize design processes and understand the interaction among diverse stakeholders such as manufacturers, suppliers, occupants, developers, builders, and professional experts, policy makers had to adapt and expand existing methodologies and concepts.

Interestingly, with such multifaceted approach, several characteristics are evident. While sociologists' writings can support policy makers in acknowledging the "human dimension" and overcoming non-technical obstacles to energy efficiency, their focus is not on anticipated responses to price signals or regulatory strategies, nor on individual choices and people's environmental values, attitudes, and beliefs. Such dimensions serve inquiry point for sociologists and pose questions to policy makers as well as technical research and design agencies. In conclusion, the paper propose that sociology has immense potentials to contribute in energy conservation policy beyond conventional assumptions. Sociology, in this sense, offers valuable insights into how policy perspectives and initiatives rest on implicit yet questionable ideas concerning choice, action, agency, and structure. Rather than assuming a conventional advisory role with a critical stance, the global cases of energy efficiency and conservation thus to be used for reflecting upon the theories and models of social change that underpin environmental research and policy. Sociologically driven multi-disciplinary approach enables the scientific community and policy makers to identify and explore novel perspectives on socio-technical change.