



Review

Renewable energy cooperatives as gatekeepers or facilitators? Recent developments in Germany and a multidisciplinary research agenda



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ARTICLE INFO

Article history:

Received 24 July 2014

Received in revised form 2 December 2014

Accepted 3 December 2014

Keywords:

Decentralization
Energy cooperatives
Energy transition
Trust
Participation
Civic engagement

ABSTRACT

The transformation of energy systems is influencing economic policy agendas all over the world, particularly in industrialized countries. In this process, Germany has taken a pioneering role, and hence the technical innovations, legal frameworks, and business models established there are also of interest for other countries trying to achieve broader use of renewable energies. Energy cooperatives have been an important building block in the energy transition in Germany, although their practical importance is neither quantitatively nor qualitatively reflected in the academic literature. Drawing on recently collected data, this paper presents an overview of German energy cooperatives in terms of organization, financing, and membership. We then review literature from economics and the social sciences that has been used to analyze cooperatives on various levels in other fields. We discuss how these theories could be applied to create a better understanding of energy cooperatives, and we derive a preliminary research agenda for their analysis. We also assess the scope for interdisciplinary work among economists, sociologists, and other disciplines.

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1. Introduction

All over the world policy makers are seeking to transform energy systems, and different strategies are being pursued to achieve better diffusion of renewable energies [1–3]. Large scale, centralized projects, as well as small scale, decentralized projects are being implemented by various actors in the sector. Industrialized countries in particular are making various efforts to promote polycentric and decentralized energy supply concepts, often including options for citizen participation with the aim of achieving an energy transition [4–7]. This increased activity in the energy sector, combined with growing awareness of interrelations between economic and environmental issues calls for a broadening of energy research in order to address the three pillars of sustainability: the social, economic, and environmental dimensions. Against this background, Sovacool and other authors have suggested that energy researchers explore or integrate concepts across disciplines to provide a sounder base for scientific analysis within the energy sector [8–10].

Complementing this broader approach for scientific analysis are strategies that enhance a broader participation of local actors and citizens. Numerous archetypical organizational models and legal forms principally allow for citizen participation in renewable energy projects [11,12]. The newly emerging phenomenon of energy cooperatives is set apart from other organizations such as investor-oriented firms or not-for-profit organizations by what Draheim has called the “dual nature of the cooperative association.” A cooperative is a social *and* economic enterprise as it strives for the economic, social, and cultural advancements of its members by following goals other than profit maximization [13]. Another key feature is that decision-making in cooperatives follows the one-member-one-vote principle, thus distinguishing them from enterprises with control rights that are proportionate to equity. Both the system of voluntary and open membership, and the considerable co-determination rights for members make cooperatives particularly compatible with the societal expectations of multi-dimensional sustainability goals in renewable energy projects [11,14].

Reflecting their perceived value, a wide range of research has focused on cooperatives. Empirically, emphasis has been placed on agricultural and credit cooperatives, and in Germany a distinct research field has emerged, focusing exclusively on cooperatives from various social sciences perspectives, the so-called

Genossenschaftswissenschaft. As a consequence of the dual nature of cooperatives, this field has always been multidisciplinary with frequent trans- and interdisciplinary collaborations [15]. It is not yet clear, however, to what extent the theoretical and methodical approaches used for agricultural and credit cooperatives are also applicable to the newly emerging phenomenon of energy cooperatives.

The aim of this paper is to respond to this challenge, using the German example as a starting point, and then deepening the analysis by reviewing theories useful for further empirical and theoretical analysis of energy cooperatives. We therefore first present data on the characteristics of energy cooperatives in Germany from organizational, financial, and members’ perspectives. Germany is Europe’s largest economy and has decided for an energy transition, which may serve either as role model or cautionary tale for other countries, particularly countries with a comparable framework and business environment, such as the Netherlands or Denmark. The German case serves as a reference point in the identification of some useful theories and methods for the study of energy cooperatives in general.

The second step of this paper is to review the existing general literature from the study of cooperatives in other fields, particularly agriculture. In the tradition of *Genossenschaftswissenschaft*, this range spans from various sub-disciplines of economics, such as economic organization and transaction cost economics, behavioral economics, and industrial organization, and reaches to sub-disciplines and topics of sociology, such as participation, conflict, and trust. From this review, we identify a multidisciplinary research agenda for the study of energy cooperatives in the social sciences.

The review focuses on disciplines that were chosen according to their relevance for the analysis of energy cooperatives and based on the results of our empirical investigations. The sub-disciplines of organizational analysis and transaction cost economics are two of the most prominent topics within cooperative literature in general, and are thus essential for a review of energy cooperatives. Behavioral economics is also examined, as the focus of this field reflects the dual nature of cooperatives, with their economic and social dimensions. Finally, the sub-disciplines of pricing, competition, quality uncertainty, and consumer demand bring a meso-level perspective into the literature review for energy cooperatives.

Regarding the sociological perspective, we highlight three distinct micro-level phenomena, all of which play an important role

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