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Contextual and psychological factors shaping evaluations and acceptability of energy alternatives: Integrated review and research agenda



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ABSTRACT

Sustainable energy transitions will be hampered without sufficient public support. Hence, it is important to understand what drives public acceptability of (sustainable) energy alternatives. Evaluations of specific costs, including risks, and benefits of different energy alternatives have been linked to acceptability of these alternatives. But how do people come up with these evaluations, and which evaluations are the key drivers of acceptability? In this review, we propose a comprehensive conceptual framework in which we integrate two growing but so far unconnected bodies of research on how objective characteristics of energy alternatives (i.e., contextual factors), on one hand, and, on the other hand, general psychological factors shape evaluations and acceptability of energy alternatives. Importantly, we identify general factors, particularly values, that may influence evaluations and acceptability of many different energy alternatives on a general as well as community level. We put forward a research agenda with two major themes. First, we lay out possibilities to strengthen the current knowledge basis for a conceptual framework that explains evaluations and acceptability of energy alternatives. Second, we suggest how the framework could be extended to explain evaluations and acceptability of energy alternatives in a more comprehensive and accurate way. Based on the knowledge developed, we discuss policy implications, some of which have not been put forward yet and hence propose new possibilities for interventions aimed at enhancing sustainable energy transitions.

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Contents

1. Introduction	362
2. Evaluations and acceptability of energy alternatives	363
2.1. Perceived collective costs and benefits	363
2.2. Perceived individual costs and benefits	363
2.3. Relationship between perceived costs and benefits and acceptability	363
2.4. Relationship between perceived fairness and acceptability	364
3. Contextual factors shaping evaluations and acceptability of energy alternatives	364
3.1. Collective costs and benefits of energy alternatives	365
3.1.1. Environmental impact	365
3.1.2. Safety of operation	365
3.2. Individual costs and benefits of energy alternatives	365
3.2.1. Price	365
3.2.2. Quality of energy supply	365
3.2.3. Physical characteristics	366
3.3. Fairness-related characteristics of energy alternatives	366
3.3.1. Spatial proximity	366

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3.3.2.	Compensation strategies	366
3.3.3.	Fair procedures	367
4.	General psychological factors shaping evaluations and acceptability of energy alternatives	367
4.1.	Place-attachment and place-identity	367
4.2.	Trust	368
4.3.	Individual values	368
5.	Research agenda	370
5.1.	Strengthening current knowledge on factors explaining evaluations and acceptability of energy alternatives	370
5.2.	Extending the conceptual framework that explains evaluations and acceptability of energy alternatives	370
6.	Policy implications	371
7.	Conclusions	373
	Acknowledgements	373
	Appendix A	379
	References	379

1. Introduction

Public acceptability is becoming a major issue in the energy domain, especially in relation to sustainable energy transitions. Different types of energy sources have been promoted as (relatively) sustainable. For example, energy generated from renewable resources such as wind, solar, and hydrogen; nuclear energy; and energy generated from specific types of fossil fuels that are argued to emit less CO₂, such as natural gas. We refer to these energy sources and their surrounding contexts, including the infrastructure, technology, regulations and policies, as *energy alternatives*. Any (sustainable) energy alternative will grind to a halt without sufficient public support, and hence it is important to understand how public acceptability develops, and how it can change to enhance sustainable energy transitions. We define acceptability of energy alternatives as a general evaluation, that is, the extent to which people (dis)favour a particular energy alternative. Acceptability of energy alternatives can be reflected in people's opinions as well as their (intended) actions towards these alternatives. We focus on *general public acceptability*, which refers to overall support for different energy alternatives, as well as *community acceptability*, which refers to acceptability of energy alternatives that are (to be) hosted within a certain community [1].¹ Our aim is to identify common factors that influence evaluations and acceptability of many different energy alternatives on a general and community level and hence are key targets for energy policies. On the basis of this, we propose a comprehensive conceptual framework that integrates key factors influencing evaluations and acceptability of energy alternatives.

The structure of this review paper is as follows. We first review studies that describe how people evaluate various energy alternatives and how these evaluations relate to their acceptability ratings. According to the literature, general public acceptability of energy alternatives depends on how people evaluate collective as well as individual consequences of these alternatives. Besides the costs and benefits per se, perceived fairness of the distribution of these costs and benefits across groups in society and perceived fairness of decision making process are expected to affect acceptability, especially when energy alternatives are (to be) sited in a certain community.

Next, we focus on factors that determine why people evaluate energy alternatives in the way they do and why certain evaluations sometimes play a larger role in acceptability ratings than

others. Based on the literature, we identify two key components that define evaluations and acceptability of different types of energy alternatives on a general as well as community level, namely *contextual factors* and *general psychological factors* (see Fig. 1). We define contextual factors as objective characteristics of energy alternatives determined by the context, for example energy price.² Actual prices of energy can define people's evaluations of how cheap or expensive an energy alternative is, thereby affecting their acceptability ratings. We define general psychological factors as subjective individual characteristics, in particular values, that may influence how people perceive objective characteristics of energy alternatives and how these perceptions affect their acceptability ratings.³ For example, given their values, people may find price as either more or less important for their acceptability ratings and, we will argue, they may even perceive the actual costs of energy alternatives differently. Hence, we argue and show that individual values have overarching effects on evaluations and acceptability, as they define which costs and benefits of energy alternatives people find most important and likely. Based on the knowledge developed and on the integrated conceptual framework, we put forward a research agenda for further exploration of this important topic and we derive implications for energy policies. The studies that were reviewed in this paper are listed in Appendix A, where we specify key details of the studies and indicate which factors from the proposed conceptual framework they addressed.

The current review contributes to the existing literature in three important ways. First, to our best knowledge, this review is the first attempt so far to systematically integrate contextual and general psychological factors in one conceptual framework that explains evaluations and acceptability of energy alternatives. This enables us to identify how multiple contextual and general psychological factors interact when shaping evaluations and acceptability of energy alternatives, which is an important asset

² It is beyond the scope of this paper to discuss macro-level contextual factors that may too impact evaluations and acceptability of energy alternatives, such as economic developments, demographic developments (e.g., population growth), institutional factors (e.g., national policies in and beyond the energy domain), and cultural developments [2–4]. We narrow down the spectrum of contextual factors to those that have direct implications for the users of energy alternatives, while acknowledging that these particular factors are embedded in, and thus should not be considered in isolation from, wider societal, economic, cultural, and political contexts.

³ Evaluations of costs and benefits and acceptability ratings are also subjective variables, and could thus be labelled as psychological factors [5]. However, they are bound to a particular energy alternative, and thus different from general psychological factors that may affect evaluations and acceptability of many different energy alternatives.

¹ Wüstenhagen et al. [1] use a term *socio-political acceptance* to refer to general acceptance of energy alternatives in society. We use the term *general public acceptability* instead because in this paper we focus on acceptability by the general public rather than specifically by policy makers or other stakeholders.

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