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Worldviews as predictors of wind and solar energy support in Austria: Bridging social acceptance and risk perception research

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ABSTRACT

With increasing demand for renewable energy, research focusing on social acceptance of production facilities has firmly established itself over the past decades. While the influence of worldviews on individuals' perceptions and behaviour has received widespread scholarly attention regarding a variety of related issues, social acceptance of renewable energy technologies (RET) has not been one of them. The study presented here addresses this shortcoming in the literature by examining the impact of various constructs, including worldviews, with respect to individuals' acceptance of RET in their vicinity. The study builds on a representative sample of Austrian citizens. Our findings suggest that RET belief is most strongly associated with acceptance regarding the construction of RET in participants' community. Further, we find that the more strongly participants feel about a variety of motives that generally support the use of renewable energies, the more accepting they are of local RET power plants. Regarding the effect of worldviews, we find that individuals who value the common good and equality are more supportive of RET in their vicinity. Our discussion focuses on the theoretical implications with particular attention to the results regarding the effect of worldviews.

1. Introduction

The past decades have seen an increasing spotlight on renewable energy sources as dire climate change prediction have conveyed the need for a radical change in the way we produce energy. Distributed renewable energy technologies (RET), such as wind power and photovoltaics in particular, have been highlighted as part of the solution in mitigating climate change, while at the same time satisfying increasing energy demands.

As the policy discourse has started to lean heavily towards RET, consumers and the private industry have followed suit, increasingly investing in RET. Describing the historic developments on the renewable energy market some authors even speak of a renewable energy gold rush, in particular when it comes to the accelerated nature of wind power developments [1,2]. These developments over the past decades have brought a fickle issue regarding the actual deployment of such technologies to the foreground: social acceptance of RET. Various cases of failed or severely delayed RET developments have demonstrated that developers but equally public authorities have frequently ignored this aspect in pushing for more RET [3,4]. In fact, recent research has supported the conclusion that in determining the success of a RET project the question of social acceptance is just as important, as issues that concern the technology itself or the legislative framework surrounding it [4–6].

Scholarly work on social acceptance of RET emerged in the early eighties developing into an important research stream with major contributions to the diffusion of RET in the past decades [6–12]. This dedicated research stream however appears to have widely neglected scholarship on risk perception, although a recent bibliometric analysis of the social acceptance literature by Gaede and Rowlands [12] proposes that eventually one subgroup of seven larger research fronts they find will look at individual-level psychological determinants of technological risk perception. This would not be a surprise, as especially with regards to issues such as emerging technologies, climate change and related environmental issues this research branch has generated a wealth of insights, applicable to studies of social acceptance. To the best of our knowledge research investigating the joint effect of different predictors that have been found relevant in social acceptance literature but equally considering variables identified in scholarly work on risk perception has not been undertaken yet.

In this paper, we specifically focus on social acceptance of RET at the local scale and investigate the respective predictive power of

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various constructs from social acceptance and risk perception literature. This includes general belief in and scepticism regarding renewable energies, strength of motives for the adoption of RET and lastly, worldview as the central construct adopted from risk perception literature. The study presented here is conceptualized in a psychometric research tradition and aimed at advancing our understanding of social-psychological correlates of social acceptance. We build on a representative sample of Austrian citizens ($N = 1000$) from a survey conducted in 2016. Our findings suggest that beliefs, motives and cultural worldviews are relevant predictors of social acceptance of RET.

We contribute to existing literature by integrating theory on risk perception with social acceptance of RET research providing a novel and theory-guided extension of existing scholarship. Our findings provide insights to scholars studying the impact of social-psychological factors by suggesting novel measures of positive beliefs, scepticism and motives related to RET, which might be further developed in future work. For the risk perception literature, we provide empirical evidence and contribute to the discussion of the applicability of the cultural cognition scales in a different cultural context. Our findings provide novel insights for practitioners and policymakers related to the siting of RET and the framing of communication measures targeting the local community.

The paper proceeds as follows: first, we provide a literature review and derive hypotheses related to contextual, personal and social-psychological factors that determine the social acceptance of RET and regarding the impact of cultural worldviews grounded in the cultural theory of risk. Then data collection, the survey instrument and the variables and measurements are described. In the next section, the results are presented and, finally, the paper ends with a discussion of the results, limitations and suggestions for further research and a final conclusion.

2. Theory and hypotheses

2.1. Social acceptance of renewable energy technology

Research on issues of social acceptance has been lagging behind the actual deployment of RET and development of policy frameworks. Starting in the early eighties, public perceptions of and support for renewable energies were considered as marginal issues, an understanding which is demonstratively expressed with summarizing these under the label: 'non-technical' factors [8]. After Carlman's [8,9] pioneering work other researchers followed suit [7,10,11] but a committed research stream was not established until the turn of the century culminating in Wüstenhagen, Wolsink and Bürer's [6] seminal paper on social acceptance of renewable energy innovation. It is evident that much of the scholarly work so far focuses on wind power. One explanation is that wind power is perceived as more controversial than, for instance, photovoltaics [3,13,14]. However, social acceptance and siting issues related to utility-scale photovoltaic projects have been discussed in literature and practice fields due to their high impact on the 'soft costs' of installations [15,16].

Following Wüstenhagen et al.'s [6] theoretical model three major aspects of acceptance of renewable energies can be differentiated.[1] At the highest level sits *socio-political acceptance*, which describes a favourable policy landscape and public support for RET, which is generally found to be high [17]. Another aspect of social acceptance according to Wüstenhagen et al. [6] is *market acceptance* defined as the degree to which a RET innovation is adopted by consumers but ultimately also by investors and within firms. The third aspect of social acceptance, *community acceptance*, then highlights issues around actual RET projects, such as wind turbines and the process of siting them.

Community acceptance mostly concerns individuals that live in the vicinity of planned or already built RET projects. In this regard, it is often observed that high acceptance on a socio-political level is contrasted by rather low acceptance at the community level [2,18,19]. To explain this apparent discrepancy previous research has discussed the concept of NIMBYism, which in essence proposes, that people's inconsistent attitudes, characterised by support at the global and resistance at the local level, can be explained as a function of general support for RET that is conditional upon not being sited in their backyard (*N*ot *I*n *M*y *B*ack*Y*ard). The NIMBY concept has been exposed to considerable criticism and it has been sufficiently shown that this concept is of limited value, most notably by studies finding evidence for the exact opposite effect, labelled as PIMBY(*P*lease *I*n *M*y *B*ack*Y*ard) syndrome [2,19–26]. However, it remains that the distance to a proposed or existing RET is an important aspect to consider when trying to measure acceptance [25].

In introducing the social acceptance concept, it is important to note that the word 'acceptance' carries specific theoretical and socio-political implications that need to be acknowledged [27,28]. In particular differences between the non-agency and agency character of *acceptance* and *support* for RET respectively have been highlighted, the former implying a 'normative top-down perspective' that carries a questionable focus on acceptance and viewing opposition as something to be overcome and thereby ignoring the latter and other forms of engagement with RET that exist besides acceptance [25,27]. Other authors, for example, have distinguished between *acceptance/acceptability* on one hand as attitudinal concepts and *support* as a behavioural construct on the other [28,29]. Dreyer et al. [29] in discussing these constructs point out an important related issue, that is the temporal dimension of acceptance. Various studies have shown that as concrete RET projects develop, so does acceptance, usually following a u-shaped curve from high acceptance before projects, to relatively low acceptance during the planning and siting stage, to then return to higher acceptance levels upon completion and operation of a finished RET project [2,23,24,30,31]. The study presented here investigates respondents' acceptance by asking them whether they would support RET structures being built in their community. As these structures are neither built, nor projected to be built we do however conceive the operationalization of acceptance/support applied here as an attitudinal construct.

2.2. Contextual, personal and social-psychological factors

Beside the narrow focus on social acceptance as a function of time or proximity, research has highlighted a series of factors that have been linked to individuals' acceptance of RET. Reviewing such factors Devine-Wright [6] distinguishes three levels of analysis: *Contextual*, *personal* and *social-psychological*. Factors studied at a *contextual level of analysis* are directly related to the particular nature of a RET project. For wind farms two frequently identified factors at this level are noise and visual impact [30,25]. Community involvement and public consultation can also be highlighted as contextual factors that substantially contribute to social acceptance of wind farms [6,13,25,32–35], issues that are tightly interwoven with the question of dis-/trust among affected publics, which has been highlighted as another important aspect in building social acceptance of wind farm projects [36]. However, since this paper does not focus on an existing or projected power plant, contextual factors are not studied here.

The *personal level of analysis* is concerned with factors directly related to the person. Devine-Wright [14] highlights variables such as age, gender and class as the primary focus of studies at this level.

[1] It is important to note, that even though these three dimensions are separately defined they are all interlinked [6]. Thus, Devine-Wright et al. [50] criticise that literature to date has mostly focused on only one of these dimensions. Building on this framework by Wüstenhagen et al. [6], Sovacool and Ratan [78] further operationalized these three dimensions of social acceptance into nine factors that have been found to create conditions which are favourable for the diffusion of RET: (1) strong institutional capacity, (2) political commitment, (3) favourable legal and regulatory frameworks, (4) competitive installation and/or production costs, (5) mechanisms for information and feedback, (6) access to financing, (7) prolific community and/or individual ownership and use, (8) participatory project siting, and (9) recognition of externalities or positive public image.