Energy Policy 89 (2016) 184–193

Contents lists available at ScienceDirect

Energy Policy

journal homepage: www.elsevier.com/locate/enpol

Realizing energy infrastructure projects – A qualitative empirical analysis of local practices to address social acceptance

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HIGHLIGHTS

- Relates evidence of the effects of local resistance to Upper Austrian infrastructure projects.
- We use a qualitative analysis to gain a holistic understanding of the social acceptance issue.
- Acceptance is hampered by political, legal, institutional and procedural frameworks.
- The issues of participation and communication play a key role.

ARTICLE INFO

Article history:
Received 29 June 2015
Received in revised form
24 November 2015
Accepted 27 November 2015
Available online 4 December 2015

Keywords:
Energy infrastructure
Qualitative analysis
Social acceptance
High voltage power lines
Wind power

ABSTRACT

The federal state of Upper Austria, at a crossing point for European energy grids, provides large-scale resources for storage of natural gas and is among the top infrastructures in this regard in Europe. Considering the ambitious plans for enhancements of energy infrastructures in this region, the issue of social acceptance of energy infrastructure is crucial. To foster an understanding of the challenges inherent in this issue we present an analysis concentrating on the social acceptance of energy infrastructure projects in Upper Austria. This paper addresses the issues with realizing energy infrastructure projects and analyzes the problems and benefits based on an empirical–qualitative study comprising expert interviews, discussions with stakeholders, and a round table workshop integrating the disparate viewpoints. The aim of the process was to integrate different attitudes, perspectives and positions of relevant stakeholders, members of citizens' initiatives, environmental organizations and of the national government and local authorities. The results presented are based on both the analysis of the empirical–qualitative data and the existing studies and literature on social acceptance. The qualitative research compares experiences and current practices with social acceptance issues (like frameworks, participation, communication strategies) in a set of considered energy infrastructure projects.

1. Introduction

Social acceptance is an important determinant of the time and effort required to realize energy infrastructure projects. To implement the vision of a transition towards to a low-carbon society by 2050 significant changes of today's energy system are paramount, such as an increased share of wind, solar and hydro power (see e.g., European Commission, 2011). These objectives implicate a significant challenge for the power grid making its expansion across the EU (European Union) necessary. These grid enhancements shall not only support the integration of renewable energy, but also address supply security and supply quality, and will foster the EU internal market for electricity. In this context, the "Ten year network development plan 2014" of the European Network of Transmission System Operators for Electricity (ENTSO-E, 2014) defines the so called "projects of common interest" which will be particularly important in order to achieve the climate and energy goals. However, not only are there technical, legal and economic aspects but also social and societal issues that will play a key role if the EU is to reach these ambitious goals. The challenge of social acceptance is also considered an urgent one by the European Commission, stating: "*The current trend, in which nearly every energy technology is disputed and its use or deployment delayed, raises serious problems for investors and puts energy system changes at risk*" (European Commission, 2011).

The federal region of Upper Austria serves as a vital example for studying issues related to social acceptance of energy infrastructure. Upper Austria and its agglomeration of the industrial areas of Linz and Wels is one of the leading economic regions in

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http://dx.doi.org/10.1016/j.enpol.2015.11.027
0301-4215/

Austria. The tertiary sector of Upper Austria depends primarily on trade and economic services while the secondary sector is dominated by industrial production, such as the metal industry or the construction industry. Upper Austria has a total area of 12,000 square kilometers and a population of almost 1.4 million people of whom about 552,000 live in the area of Linz–Wels (see Statistics Austria, 2011). Accordingly, this federal state has a share of 17% of Austria's total gross domestic product of about 300 billion euros. Austrian electricity production strongly depends on renewable sources which account for about 80% of Austria's electricity production. Among these, hydropower takes on a special role and accounts for about 70% of the overall electricity production. Energy generation in general from renewable energy sources (including biogenic gas and fuels, wind power and photovoltaic) amounted to about 31% of total production in 2012. In addition to natural gas (25%) and oil (37%), combustible waste (6%) is used for the domestic energy production in Austria (BMWFW, 2014).

Ensuring the status of Upper Austria as a location for energy-intensive businesses as well as a quality living environment with a high degree of electricity supply security, new power lines at all voltage levels have to be built and the storage of electricity through the construction and expansion of pump-hydro storage facilities (and other storage technologies) are important (see ENTSO-E, 2014). These efforts are visible in the Austrian national development plan of the Austrian transmission system operator (see Austrian Power Grid, 2013) as well as in the planned projects of several distribution system operators.

Despite the fundamental importance of many of the planned activities, various energy infrastructure projects in Upper Austria are met with significant resistance, which is closely linked to the social acceptance issue. Generally, the term social acceptance or public/local acceptance is associated with different levels of the active/passive support or rejection by different local and regional stakeholders (like communities, citizens, interest groups, politics etc.) regarding various energy infrastructure projects (Wuestenhagen et al., 2007) (see Section 2). Existing scientific work provides several analyses regarding the social acceptance of wind farms (e.g. see Jobert et al., 2007; Aitken, 2010; Pasqualetti, 2011), transmission lines (e.g. see Soini et al., 2011), carbon capture and storage installations (e.g. Fischedick et al., 2009; Kraeusel and Möst, 2012), hydrogen fuel stations (e.g. Huijts et al., 2014) and pump hydro-storage (see e.g. Steffen, 2012). Although basically the need for new transmission lines is recognized, objections and concerns due to possible negative impacts on the affected environment, such as health (e.g. through electromagnetic fields) and protected natural as well as touristic areas, are raised (see Soini et al., 2011; Devine-Wright and Batel, 2013; Devine-Wright, 2012). The perceived visual impact of new pylons, transmissions lines or wind farms on the landscape plays a key role, and is one of the most important predictor of the public's opposition or support (see Devine-Wright and Batel, 2013; Wolsink, 2000). Furthermore, resistance can arise not only through perceived hindrance and safety risks but also due to suspected inefficiencies and low benefit-cost ratios (see Huijts et al., 2014). On the whole, local based resistance against energy infrastructure occurs for different reasons of which the most urgent ones were found to be: diminished view, safety concerns, noise, pollution, landscape destruction, ecological change, decreased property values, and perceived procedural injustice (see Schweizer-Ries, 2010; Aas et al., 2014; Cohen et al., 2014; Zoellner et al., 2008; Burningham et al., 2006).

It is evident that opposition can delay or even impede the realization of these projects. Several scientific studies dealing with the social acceptance in different types of projects have been conducted. The project ACCEPT (*Analysis of Customer Conception for Energy commission and Transmission*) adds to the the literature with a unique dual local–national focus. Hence, we concentrate on the social acceptance issue in the context of realizing energy infrastructure projects (transmission lines and wind energy) in Upper Austria, while at the same time isolating those conclusions being relevant in a larger context. We focus on recent projects of power lines and wind power to discuss different aspects of the social acceptance issue. We conducted several expert interviews with the aim to integrate different attitudes, perspectives and positions of relevant (local) key stakeholders (like planners and operators, members of citizens' initiatives, environmental organizations and the national government and local authorities). According to the qualitative content analysis of (Mayring, 2015), we get deeper insights into the challenges, barriers and problems in planning and realizing these projects with regard to the Upper Austrian situation. In doing so, we are able to compare experiences and practices addressing social acceptance issues (like frameworks, participation, communication strategies) in the considered energy infrastructure projects and employ both deductive and inductive reasoning in our analysis. Based on this research, it is possible to gain a holistic understanding of the social acceptance issue on a local level.

First, we present an overview of the existing scientific research on social acceptance issues and its relevance for our own work. The definition of "social acceptance" as used by us is given in Section 2 where the concept of the Not-In-My-Back-Yard (NIMBY) activism is introduced. Additionally, in this section we summarize the factors influencing social acceptance as found in the literature. In Section 3 we clarify the qualitative methods used for the empirical data collection and their evaluation and analysis. Furthermore, our results concerning the evidence and role of social acceptance in the Upper Austrian situation based on the analysis of our evaluated qualitative empirical data are described. In Section 4 we focus on the participation, communication and information strategies practiced in the interested projects which will result in recommendations for practicable participative models, while Section 5 concludes.

2. Social acceptance issues on a local based area – evidence from acceptance research

Survey results indicate that the Austrian public opinion tends to be favorable for renewable energies (see e.g. Gfk, 2014), but at the same time these energy infrastructure projects are frequently confronted with problems relating to social acceptance. A misinterpretation of the acceptance issue hampers the implementation of infrastructure projects (see Devine-Wright, 2008; Wolsink, 2012) since there are different understandings of the theoretical and practical meaning of social acceptance.

In creating context for our research question – the influence of social acceptance on the successful planning and realization of energy infrastructure projects – we clarify the term social acceptance for our analysis. Over the past decade the topic of social acceptance has been vitally researched in the context of the European energy system, see e.g. Wuestenhagen et al. (2007), Devine-Wright (2012), van der Horst (2007), Wolsink (2012) and Devine-Wright (2009). Therein, the concepts of social acceptance are discussed from different perspectives and from various disciplines such as social science, economics, land use policy, environmental psychology etc., and we subsequently lay down the dimensions of social acceptance as it pertains to our own analyses.

2.1. Dimensions of social acceptance

When conceptualizing social acceptance in the context of renewable energy and energy infrastructure, we distinguish between three dimensions, namely socio-political, community and