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Exploring public engagement with geothermal energy in southern Italy: A case study

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HIGHLIGHTS

- Original research based contribution on public views on geothermal energy.
- Results show that geothermal energy might have conflict potential.
- Deep seated distrust in institutions, companies and decision makers.
- Reflections upon public engagement activities in energy policy making.

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ABSTRACT

This paper presents the results of an assessment of public views on eventual geothermal energy development in Sicily. The research was carried out under a much wider research project, VIGOR, with the aim to explore the feasibility of geothermal energy utilization in southern Italy. This study has two primary objectives: (1) to explore the views and opinions of local communities regarding the potential of geothermal energy applications; (2) to contribute to the growing literature on public engagement with energy issues. In order to explore public views towards geothermal technologies, we conducted a case study using both qualitative and quantitative methods. Although Italy has enormous geological potential for geothermal energy production, levels of knowledge of this energy source amongst the public are low. The results indicate that the issue is shrouded in uncertainty and that the Sicilian public expresses a diffused lack of trust in decision-making processes. Taken together, these factors are likely to strongly impact eventual further developments in this sector. The results clearly show the need for further societal dialogue supported by a sound communication action strategy as the first stage in a public participation.

1. Introduction

1.1. A short history of geothermal energy in Italy

Italy was a pioneering country in exploiting the potential of geothermal resources for energy power production. Already in 1904, when Piero Ginori Conti successfully experimented with the generation of electricity from geothermal steam, the first geothermal power plant was built in Larderello in Tuscany (Luzzini, 2012). Italy is presently ranked in the top five countries worldwide for geothermal power production and, according to the European Geothermal Energy Council, it is expected to produce by 2020 an electricity installed capacity of 1965 MW and 15.600 GWh, which is the 4.2% of the national energy demand (Zervos et al., 2011). Data collected in 2010 show that the geothermal production in Italy is now only 1.8% of the total national electricity production, but it is about 25% for Tuscany, where the two major geothermal areas of the country are located: Larderello-Travale/Radicondoli and Mount Amiata (Bertani, 2012). There are few studies on public views on geothermal energy and the case study reported upon in this paper was carried out within a much

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wider interdisciplinary project, VIGOR, funded by the Italian government.[1] VIGOR is dedicated to assessing the feasibility of developing geothermal energy in four regions of southern Italy (Albanese et al., 2014) and to the diffusion of knowledge of the numerous geothermal energy technologies (Botteghi et al., 2012; Abate et al., 2014).

1.2. Social acceptance of renewables and RRI

Although the importance of the role of social research in energy studies has long been recognized, social sciences currently play a surprisingly marginal role in energy research (Pidgeon et al., 2014, Stirling, 2014). Engineers, scientists, economists and policy makers focus on technical details and often ignore the importance of taking into account the lifestyles of the communities and their social norms (Sovacool, 2014).

The term '*social acceptance*' is often used in the energy policy literature, but clear definitions are hard to find. In the case of renewables, Wüstenhagen et al. (2007) defined social acceptance as a combination of three different dimensions: (i) socio-political acceptance that is the acceptance considered at a broadest, general level and relates with technology itself, public perception, key stakeholders and policy makers; (ii) community acceptance that refers to specific decisions about sites and relates to procedural justice, distributional justice and trust; and (iii) market acceptance that has mainly to do with consumers, investors and intra-firm relations.

Published studies on social acceptance of geothermal energy are very few and most of them are quite recent. Polyzou and Stamataki (2010) used a survey to study social acceptance of geothermal energy on the Greek islands of Milos and Nisiros, where public information and the active involvement of citizens were considered essential elements of project design and management. Dowd et al. (2011) developed an engagement workshop aimed at providing the general public in Australia with the opportunity to interact with scientists experts in geothermal energy: the results show a general support for the technology, low levels of knowledge of the technology, and some concern about induced seismicity and water usage associated with geothermal systems. Carr-Cornish and Romanach (2012) explored public views on geothermal energy in Australia using a mix of media analyses, online and face-to-face focus group and a questionnaire distributed during focus group. Geothermal energy was perceived positively in the battle against climate change and for promoting low carbon societies, while the perceived risks are related to economic feasibility, technical uncertainties, potential seismic activity and water pollution.

In general, technologies for the harnessing of renewable energy are positively viewed by the European public, although interestingly enough, levels of acceptance in Italy are somewhat lower than the EU average (Gaskell et al., 2010, 2011). In recent years, European Union's mission to encourage scientific innovation and develop a knowledge-based society capable of creating new jobs and prosperity, while preserving the environment and meeting societal needs, has merged into a new approach termed Responsible Research and Innovation (Owen et al., 2012; von Schomberg, 2013).

One of the pillars of the Responsible Research and Innovation (RRI) approach is to embed considerations of societal needs and ethics in the innovation process and that requires the involvement of social sciences. This approach strongly encourages "upstream" engagement (see Jasanoff, 2007) of stakeholders (politicians, manager, citizens, associations, etc.) already in the early stages of the innovation process. This allows all stakeholders to (i) be aware of the consequences of their actions and of the range of options open to them, (ii) evaluate outcomes and options of every possibility in terms of ethical values, including equality, autonomy, sustainability, democracy and efficiency, and (iii) use these considerations as functional requirements to design and develop new research, products, and services (Van den Hoven et al., 2013).

RRI might be heralded as a new approach, but it evidently shares some features with strong ecological modernization (EM) theories (Breukers and Wolsink, 2007b; Gibbs, 2000), intended as valuable conceptual framework "for gaining an understanding of the ways in which environmental considerations and interests trigger changes in (global) institutions and social practices that are heavily infected by globalization" (Mol, 2002, p. 110) and conditioned by the progressive metamorphosis of government into governance (Jordan et al., 2003). According to this approach, the traditional patterns related to environmental policy are changing and new agents, like the civil society, are considered key actors in shaping environmental politics.

1.3. Society and carbon lock-in energy system

It is often claimed that industrial countries have become "locked into" fossil fuel based systems through path dependent processes culminating in the techno-institutional complex (TIC) brought about by technological, organizational, social and institutional co-evolution (Unruh, 2002). From this perspective, as institutions are by definition rather resistant to change, social change often precedes and outpaces institutional change.

The complexity of innovation process is further emphasized by Jacobsson and Johnson (2000, p. 629) who argue that "the determinants of technology choice are not only to be found within individual firms, but also reside in an "innovation system" which both aids and constrains the individual actors making a choice of technology within it". The system is composed by three main elements: the actors and their competence, the networks and the institutions. These components can reinforce one other and act as inertial forces that prevent innovation in favor of existing technologies.

Lehmann et al. (2012, p. 325) define this "path dependence" as "the result of contingence and increasing returns to scales favoring a certain technology or country without being intrinsically superior to alternatives". Authors describe in nuanced details the carbon lock-in barriers preventing innovation that, with the exception of "generation barriers", have long been neglected. The diversification of the barriers described and the set of solutions proposed, clearly show how energy innovation requires simultaneously and coordinated efforts by different social actors (i.e. policy makers, investors, civil society).

Diverse options engaging society as a whole are proposed in the literature in order to overcome carbon-lock in energy systems and activate renewable energy innovation mechanisms. Jacobsson and Johnson (2000) identify "prime movers" as potential key actors able to trigger innovation. Unruh (2002) hypothesizes that a discontinuity to existing energy system could come from a niche approach or special interest groups. Pilot projects are also encouraged as previous steps towards renewables development in areas where largely unknown technologies are to be tested (Lehmann et al., 2012). External events that impact society, shape opinions and press institutional interventions (i.e., climate change

[1] This research was conducted within the VIGOR project, a three-year program dedicated to a comprehensive assessment of geothermal energy potentials and applications in four regions of Italy (Apulia [Puglia], Calabria, Campania, Sicily [Sicilia]). VIGOR aims to study a wide array of geothermal applications, from low to high enthalpy, depending on the natural resources and the economic and social aspects of the reference territories. Consistent with the RRI approach, the VIGOR Project is investigating the geothermal potential of southern Italy by adopting a comprehensive approach that includes social studies such as our case study (Albanese et al., 2014).