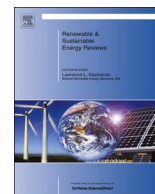




Contents lists available at ScienceDirect

Renewable and Sustainable Energy Reviews

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

Exploring the global media image of solar power

Kalle Nuortimo^{a,*}, Janne Härkönen^b, Erkki Karvonen^c^a University of Oulu, Information and Communication Studies, Industrial Engineering and Management, P.O. Box 4610, FI-90014 Finland^b University of Oulu, Industrial Engineering and Management, P.O. Box 4610, FI-90014 Finland^c University of Oulu, Information and Communication Studies, P.O. Box 4610, FI-90014 Finland

ARTICLE INFO

Keywords:

Public acceptance

Solar power

Media analysis

ABSTRACT

This paper analyses the media image of solar power in order to understand the recent technology development trends. The increase in both solar PV panels as well as concentrated solar power plants has been influenced by decrease in solar power price, as well as subsidies and general public acceptance. This paper focuses to the latter, through quantitative media analysis.

This paper utilises a modern method for media sentiment analysis from both editorial and social media, learning machine based analysis including over 50 000 data points. The results indicate that sentiment toward solar power, especially in social media, has been mostly neutral or positive thus with expected positive effect on technology market deployment.

1. Introduction

Due to Paris COP21 agreement being signed, the global warming, a multidisciplinary challenge for both legislators and technologists, has attracted more focus by the international media. The continuous concerns, that anthropogenic carbon dioxide (CO₂) emissions are contributing to the global climate change, and thus the need to reduce atmospheric CO₂ have pushed all levels of society to solve this issue. Particularly solar power can play an important role in areas with high pollution from fossil power plants, such as in China, to meet country's energy demand and reduce greenhouse gas emissions [34].

As a response to climate change, governments around the world are committed to reduce their reliance upon fossil energy sources in order to increase the low carbon sources of energy, specifically nuclear and renewable energy [9]. Different countries have also formulated solar energy policies to reduce dependence on fossil fuels [30]. As a consequence, wind farms, solar panels, technologies for carbon capture and storage are now being developed at an increasing rate [3]. However, CCS (Carbon Capture and Storage) does not seem to be commercialising for coal power plants [28]. In the case of CCS, the public acceptance is seen to be crucial for the technology's successful market deployment [15]. Since 2010, the world has added more solar photovoltaic (PV) capacity than in the previous four decades and total global capacity overtook 150 gigawatts (GW) in early 2014, furthermore in the future PV's share of global electricity is estimated to reach 16% by 2050, a significant increase from the 11% goal in the 2010 [16]. As assessed by Turney, Fthenakis [32], none of the environmental

impacts of solar power are negative compared to traditional power generation.

2. Literature study

Although nuclear power and renewable power are considered as the evident near zero technology power production options, they vary from sustainability and acceptability point of view. Renewable power is considered to be sustainable, nuclear is not, and also public acceptability of nuclear power is rather low [33]. In the case of CCS, Carbon Capture and Storage from coal plants, despite the global availability of storage sites, there exists a risk influencing public acceptance, namely possibility of CO₂ leaking from storage site. Furthermore, supply security would favor the CCS technology market deployment in a large scale in contrast to solar power, and also reaching medium term (10-20 years) targets for almost zero CO₂ power production in coal power sector. The CCS technology communication activities have been ongoing starting from the early 2000 [2]. It seems, that CCS technology's commercialisation is dependent on the public opinion, and also the related media communication. Recently, multiple studies have been committed on public perceptions of carbon capture and storage (CCS), and in addition there has been effort to translate such knowledge into toolkits for public engagement and communication. However at the same time, both literature and toolkits have had lesser focus to the organisational dynamics and views of project implementers with regard to public engagement [4]. It would be necessary to allow the improved understanding of the global capacity and the applicability of CCS to

* Corresponding author.

E-mail addresses: kalle.nuortimo@amecfw.com (K. Nuortimo), janne.harkonen@oulu.fi (J. Härkönen), erkki.karvonen@oulu.fi (E. Karvonen).<http://dx.doi.org/10.1016/j.rser.2017.06.086>Received 15 July 2016; Received in revised form 21 March 2017; Accepted 22 June 2017
1364-0321/ © 2017 Elsevier Ltd. All rights reserved.

potentially strengthen the global trust, awareness and the public confidence in the CCS technology [7]. Furthermore, based on a Granger causality test, it was found that nuclear energy can help in reducing CO₂ emission, but by 2010, the renewable energy consumption had yet not reached the level of significant contribution to emission reduction [22].

To promote the low carbon energy and associated infrastructures for tackling climate change is an essential task also for governments worldwide, however, public and, mainly, local, opposition to those infrastructures may slow down or even halt that process [3]. That is why it is important to study, how the uncertainties and fears in public acceptance can affect the technology market deployment. It is to be noted, that the targets are challenging, some of which governments have now set to boost increase in the deployment of renewable energy, further giving pressure also to the systematic social science research on public engagement with renewable energy [9]. Also, it is to be noted that without understanding the energy mix of a society, lay people may show inconsistent preferences, such as support expansion of solar power, but may not want transmission lines [29]. However, sceptic research also exist, which does not see common future for nuclear and renewables, and depicts nuclear power as a waste of R&D resources [33].

By looking at the past, it can be observed, that links between technologies and societal controversies exist, which have then might have led to public rejection of technology, emphasising the urgency to understand also the psychological features of societal acceptance of emerging technologies [12]. In addition, it has been studied, that media framing can influence to public acceptance [13]. Earlier example cases of failed technology commercialisation exist with an indication, that the social acceptance can be a decisive factor for technologies, and that the early adoption of general public may be essential for technology acceptance [2]. Hence, public acceptance of renewable technologies is critical factor for their successful introduction into society [15]. Public acceptance of technologies is continuing to be a focus of scholarly attention also in case of other technologies, as can be observed from the steady rise in the number of publications and determinants investigated that are found to impact the acceptance [12].

Recently, although there has been various studies that have investigated renewable power technology acceptance, research and development of renewable energy has been dominated mainly by technological and economic approaches to date, lacking of social science input [9]. Most technology acceptance studies have focused on a limited set of factors that can influence public acceptance, and have not been based on comprehensive frameworks thus missing some technology acceptance key factors [15]. However, there is a growing trend of literature describing or explaining the renewable source market penetration, consisting of mainly three types of studies: ones, which look at national styles of regulation, those which analyse renewable energy barriers and the ones investigating the factors driving local opposition, usually based on surveys of public attitudes and beliefs [31]. The positive overall picture for renewable energy in general, and PV energy in particular, has influenced the beliefs of policy makers and researchers, that public acceptance is not an issue, although this acceptance, like all social processes, is not static, and it is subject to changes, thus the same occurs in the mass media coverage and framing that can affect the afore mentioned public acceptance [13]. The terminology related to acceptance has recently been reviewed by Batel et al. [3] and it can be understood to justify, legitimise and reproduce the top-down perspectives, thus focusing only on acceptance and at the same time ignore relevant issues, such as support, resistance, apathy and uncertainty. Furthermore, it is usually assumed that public attitudes would need to somewhat change in order to make the more radical scenarios of the implementation of renewable energy technologies feasible [8].

It has been noted how media reporting of some environmental issues is heavily influenced by socio-political factors over time, and has

become increasingly affected by political and industry interests [13]. Sovacoal [31] has described factors, such as political commitment and positive public image, which during their presence influence to the increase in market, socio-political and community acceptance of renewable electricity. Evident from the case studies by Jobert et al. [17], the factors of social acceptance identified in the literature are visual impact, ownership, information and participation, thus acceptance related to the project implementation include local integration of the developer, the creation of a network of support, and access to ownership. In a study of Australian wind farms, four common themes were found influencing the societal acceptance, namely trust, distributive justice, procedural justice and place attachment [14].

During the growth of PV installed capacity in Spain, there has then been an intense media debate during the phase of decline experienced by the sector. This debate tended to highlight negative aspects related to the development of the PV sector. In a socio-economic environment at a time of major economic crisis on an institutional level, the predominant discourse regarding PV energy in recent years has tended to focus on the markedly conservative and non-reformist standpoint, which is, in short, in opposition to the development of renewable energies [13]. In case of local project opposition for renewable projects, there seems to be a trend to generalise the character of opposition movements with short-hand labels such as 'NIMBY' (Not in My Back Yard), with only minor examination of the reasons underlying that opposition [10].

3. Methodological approach

The research methodology this paper applies utilises the principles of prior public acceptance studies, however, incorporating a learning machine based media-analysis consisting of utilisation of big-data of editorial and social media sources. The study is supported by a relevant literature review. The research principles have been formerly used in different fields, and public acceptance studies have been carried out with media analysis but with smaller datasets. Sentiment analysis has previously been applied for example in the field of marketing. Also, research initiatives such as creating an automatic nuclear power acceptance tools have existed [27]. This study relies on a commercial software. As a new application, a similar type of method was used by Burscher et al. [5] including media framing from editorial content and automated sentiment analysis by software. In this study, however, it was decided not to apply media framing, cluster analysis or statistical methods. This relates mainly to comparison of editorial content with social media, and also to the challenges related to framing of two types of communication. Furthermore, it might also be difficult to find a suitable statistical method for data-series analysis.

Furthermore, this study combines the existing elements in a new way, thus the users of so-called social web have now a role also as a data providers, and this provides an excellent platform also for analysing public attitudes [26]. The main reasons for choosing learning machine, big data based media-analysis method was the applicability to enormous global datasets, both from editorial content and the social media, fast data processing and also the reduced bias risk, possible due to interpretations and perceptions of humans [20]. By adopting this type of approach, the quantity of media sources to be analysed increases significantly compared to questionnaires and interviews. Relying on a qualitative method such as research interviews would have had its drawbacks in global media coverage study, for example responses are difficult to code and answers may vary by participant and also some respondents may provide socially desirable responses, telling researchers what they think they want to hear [31]. The analysis was conducted to clarify the solar power technologies' social acceptance status and to investigate its possible connection to recent increase in solar power technology market deployment. The analysis findings were synthesised to obtain some insight over the social acceptance on solar power technology development and market deployment. Hence, the

Download English Version:

<https://daneshyari.com/en/article/8112467>

Download Persian Version:

<https://daneshyari.com/article/8112467>

[Daneshyari.com](https://daneshyari.com)