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Societal acceptance of an emerging energy technology: How is geothermal energy portrayed in Australian media?

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ABSTRACT

The media shapes and is shaped by public sentiment of emerging technologies. One way to gauge the societal acceptance levels of an emerging technology, such as geothermal energy technology in Australia, is to analyse how the technology is reported in the media. This study identified the benefits and risks that have been reported and the social actors represented, informed by extant research of factors that impact societal acceptance. A total of 451 Australian news items on geothermal energy technology published between July 1st, 2011 and June 30th, 2012 were used for this content analysis, which encompassed the release of the Australian Government's *Clean Energy Plan*. Consistent with geothermal technology being an emerging technology in Australia, economic feasibility and uncertainty about the technology were the most frequently reported risks. Industry was one of the most cited social actors in geothermal news media and it was more likely to be cited in articles reporting the economic feasibility and uncertainty about the technology, reflecting the current state of the industry in Australia. Renewable and low-emission energy were the most frequently cited benefits, which were often reported as part of the Australian Government *Clean Energy Plan*. Overall, this emerging technology has maintained a restricted profile in the media to date, with limited controversy or politicisation. This profile is likely to remain, in particular the focus on the technology economic feasibility, which remains the main challenge to the technology entering large-scale development in Australia.

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Contents

1. Introduction

Previous research has demonstrated that media has an influential role to play in transferring knowledge of emerging science and technology, such as stem cell research [1], nanotechnology [2], biotechnology [3] and climate change [4]. The media also have a

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role in shaping perceptions, as the majority of the public have limited direct-experience with emerging scientific and technological issues, and media coverage of these complex issues often becomes the key heuristics for the ordinary citizen [1,5]. A previous study analysing media attention to carbon capture and storage has confirmed the need to attend to the media when studying public acceptance [6]. This is because the degree of public attention to issues is heavily influenced by the degree of media attention to those issues [7]. As argued by Hornig [7: 97] when the media focuses 'the public's attention on a risk issue, no matter what is actually said about it, the media may be inviting their audience to be concerned'. Therefore, by determining which stories are reported and how they are framed, the media determines which issues and viewpoints enter the public debate [8].

In addition, following the media discourse about an emerging technology and understanding how the benefits and risks of the technology are portrayed as new energy technologies move from development to large-scale commercial applications is essential for industry to meaningfully engage with the public in the different stages of technology adoption. Consequently, one way to gain insight into societal acceptance of an emerging energy technology, such as geothermal energy technology in Australia, is to observe how the technology has been reported by the media.

Australia has a history of using direct-use geothermal applications to heat swimming pools and spas, but has only one small geothermal plant, that provides 80 kw of electricity to the remote town of Birdsville in Queensland [9:213]. While geothermal energy technology is relatively immature and unknown in Australia, it has a long history in some parts of the world. Commercial geothermal electricity production started in Lardello, Italy, in 1916 [10]. Larderello remained the world's only geothermal power plant until the 1950s, when a plant was established in New Zealand. More recently, in 2010, it was estimated that 24 countries, including the United States of America, Indonesia, Italy, Mexico and the Philippines, were generating electricity from geothermal resources [11:1]. In addition, electricity from geothermal resources has a significant share of total electricity generated in many countries, including Iceland (25%), El Salvador (22%), Kenya and the Philippines (17% each) and Costa Rica (13%). Geothermal energy is also used through direct-use applications in 78 countries, which include geothermal heat-pumps for heating and cooling, water-heating in pools and spas (26%), and space-heating (15%) [12: 161].

Australia has considerable geothermal energy potential for both hot rocks and hot sedimentary aquifer geothermal applications [13]. Currently, there are several large projects at the feasibility study and approval stage in both Victoria and South Australia, and geothermal energy is expected to account to 8% of total electricity generation in Australia by 2050 [14]. Although small, such an increase will result in Australians being exposed to more geothermal energy technology than they have previously. The aim of the media analysis reported in this paper is therefore to explore how geothermal energy was portrayed in the Australian media at the time The Australian Government's *Clean Energy Plan* [15] was released. In doing so, this paper identifies the main perceived risks and benefits of geothermal energy reported in the Australian media as well as which social actors are linked with the risks and benefits reported.

2. Public perceptions of geothermal technology

Societal acceptance is essential for the development of emerging energy technology [16]. In the past decade, numerous studies have reported public concerns worldwide in regard to energy technologies, including nuclear power plants [17], wind energy developments [18], carbon capture and storage technology [19], and geothermal energy technology [20,21]. Accordingly, the impact society can have on technology (and vice-versa) is increasingly recognised, with several studies showing the importance of engaging and addressing ethical and social implications at the early stages of science and technology development [22].

The need to attend to ethical and social implications is also often coupled with low levels of public awareness of energy technologies, including geothermal technology. For example, a Eurobarometer conducted in 2011 showed that the majority of Europeans are unaware of the amount of electricity produced by renewable and non-renewable sources in their home countries [23:12]. In addition, the same survey showed that only 47% of Europeans were aware of geothermal as an alternative energy source [23:12].

In Australia, similar studies have reported low levels of knowledge about geothermal technology across the general population [24,25]. A previous Australian study showed that around one-quarter of respondents (27%) reported no knowledge of geothermal energy, with only 38% of respondents reporting their knowledge as moderate to high [25]. Despite the low levels of knowledge reported in the survey, the majority of respondents (57%) indicated that they would agree with the use of geothermal energy technology in Australia while 31% of respondents were unsure [25].

A study by Carr-Cornish and Romanach [26] tested Australians reaction to geothermal energy information that is currently available on the internet. Information provided to participants included a mix of factual and non-factual information. The findings of this study showed that information provision could have an important role to play in forming public attitudes in the early stages of technology development.

In addition, research of emerging energy technologies has consistently suggested that acceptance is influenced by a range of factors, including those focused on in this study: the benefits and risks of the technology and the influence of social actors involved in a technology's development [27]. In an effort to identify how, in Australia, acceptance of geothermal energy technology has been characterised to date, this study sought to identify what benefits and risks have been reported in the media and which social actors were represented.

2.1. Benefits and risks perceptions

Exploring the narratives in which renewable energy is discussed in Australia is key to understand how the media frames the benefits and risks of geothermal energy in Australia. According to Curran [28] the main narratives present in the discussion about renewable energy in Australia are feasibility, security, cost and jobs. These narratives include claimed risks such as increased electricity costs, negative effect on jobs and the inability of renewables to provide reliable and uninterrupted supply of energy [28].

Understanding how the benefits and risks are considered within society plays an important role when investigating public perceptions of science and technology. Research suggests that most individuals are opposed to 'risky' technologies and thus risk assessment plays an important role in the formation of attitudes towards emerging technologies [29]. Previous research has also shown that individuals are more likely to support a technology when they perceive that the benefits of such technology outweigh its risks [27,30]. This dynamic has also been documented in studies of nanotechnology, biotechnology and stem cell research [31]. Previous research on public acceptance of low-emission energy technologies such as carbon capture and storage have also identified that benefits of emerging low-emission energy technologies (i.e. reduced carbon emissions) are mainly global in nature

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