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Energy Policy

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

Nuclear power in Australia: A comparative analysis of public opinion regarding climate change and the Fukushima disaster[☆]

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HIGHLIGHTS

- Australia-wide survey assessed opinions of nuclear power in 2010 and 2012.
- Study examined attitudes in relation to climate change and Fukushima disaster.
- Australians believe nuclear power offers a cleaner, more efficient option to coal.
- Australians are against nuclear power due to safety concerns and distrust.
- Reluctant acceptance of nuclear power is a fragile attitudinal state easily swayed.

ARTICLE INFO

Article history:

Received 9 September 2012

Received in revised form

4 September 2013

Accepted 11 September 2013

Keywords:

Climate change

Public attitudes

Energy futures

ABSTRACT

A nation-wide survey was conducted in 2010 to investigate the Australian public's attitudes to nuclear power in relation to climate change and in comparison to other energy alternatives. The survey showed a majority of respondents (42%) willing to accept nuclear power if it would help tackle climate change. Following the disaster at the Fukushima Daiichi Nuclear Power Complex in Japan, an event triggered by the 11 March 2011 Tohoku earthquake and tsunami, it was expected that support for nuclear power in Australia would change. In light of this, a follow-up survey was conducted in 2012. Indeed, the post-Fukushima results show a majority of respondents (40%) were *not* willing to accept nuclear power as an option to help tackle climate change, despite the fact that most Australians still believed nuclear power to offer a cleaner, more efficient option than coal, which currently dominates the domestic production of energy. Expanding the use of renewable energy sources (71%) remains the most popular option, followed by energy-efficient technologies (58%) and behavioural change (54%). Opposition to nuclear power will continue to be an obstacle against its future development even when posed as a viable solution to climate change.

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1. Introduction

Although Australia has significant reserves of uranium and is one of the world's main exporters of the mineral, it does not itself exploit nuclear power. This is despite the country having a stable political and economic environment in addition to relatively stable geology, an important factor with respect to the location of nuclear power stations and for storing radioactive waste. Some prominent

Australian environmentalists¹ have advocated the use of nuclear energy as a low-carbon alternative to burning fossil fuels, and several countries – particularly China and India (IAEA, 2011a) – are expanding their nuclear industries with 65 nuclear power reactors under construction worldwide (IAEA, 2011b). In Australia, however, the tenor of the debate about the possibility of using nuclear power remains muted. Of the two major political parties, Labor's long-standing policy is to oppose its development, while the Liberal Party has generally supported the notion (Choose Nuclear Free, 2010).

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¹ For example, Barry Brook is a leading environmental scientist holding the Sir Hubert Wilkins Chair of Climate Change at the University of Adelaide where he is also Director of Climate Science. Professor Brook is an advocate of low-carbon energy solutions, including nuclear power, to address climate change issues. Professor Tim Flannery, chairman of the Copenhagen Climate Council and Australia's Climate Commissioner also advocated nuclear power as a possible solution for reducing Australia's carbon emissions but later changed his stance to be against nuclear power in 2007.

The absence of serious debate may arise from the political perception that there is deeply embedded opposition to nuclear power within the Australian community (Falk and Settle, 2010; Graetz and Manning, 2011). Other considerations are Australia's energy dependence on coal-fuelled power stations (Hamilton, 2001) and concerns about the safety of nuclear material (Schläpfer, 2009). Regardless of the veracity of these perceptions, there is currently little public information as to whether or not Australians are willing to embrace nuclear power as an alternative to fossil fuels. Given Australia's political commitment to reduce greenhouse gas emissions (Pielke Jr, 2011), knowing what the Australian public thinks about nuclear power as one reliable 'solution' to anthropogenic climate change is important.

To address this, we conducted an online survey in 2010 that examined the public's perspective about the acceptability of nuclear power as an option to help tackle climate change. However, since our survey was conducted, the tsunami-induced nuclear meltdown at the Fukushima Daiichi nuclear plant in Japan following the Mw 9.0 Tohoku earthquake on 11 March 2011 provoked negative reactions to nuclear power around the world. Several governments, including those in Germany, Switzerland, Italy and Japan, indicated plans to phase out nuclear power.

While researchers speculated that public support for nuclear power might lessen following a major accident (e.g. Butler et al., 2011; Pidgeon et al., 2008), this was not the case in the UK following the Fukushima disaster (Poortinga et al., in press). We therefore undertook a follow-up survey in 2012 in order to document whether or not public attitudes in Australia towards the development of a nuclear power industry had changed.

Using the 2010 and 2012 survey results, this paper:

- examines public opinions of nuclear power in the context of anthropogenic climate change,
- determines whether or not the Australian public's opinions of nuclear power changed following the issues at the Fukushima Daiichi nuclear power plant in Japan, and
- discusses public views on energy futures in Australia in relation to reducing greenhouse gas emissions.

Before describing the methods and results of the surveys, we first outline relevant aspects of the Australian energy situation, political perspectives of nuclear power and climate change, and the media, opinion polls and question framing. The paper concludes with a discussion of the survey results in relation to energy futures in Australia and what implications these might have for policy debate.

2. Energy, climate change and opinion polls in Australia

2.1. Current energy use and targets

In a government-sponsored and commissioned report, Garnaut (2008) notes that Australia's emissions-intensive electricity sector

Table 1
Per capita metric tonnes of CO₂-emissions (from The World Bank, 2013).

| | 2009 |
|-------------|------|
| Australia | 18.4 |
| Brazil | 1.9 |
| Canada | 15.2 |
| China | 5.8 |
| Germany | 9 |
| New Zealand | 7.4 |
| UK | 7.7 |
| USA | 17.3 |

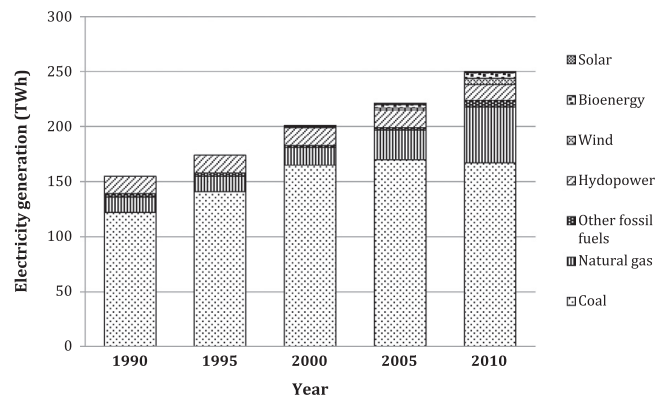


Fig. 1. Temporal evolution of the energy mix in Australian electricity production, 1990–2010 (from Stark et al., 2012).

Table 2
Australian total final energy consumption by industry, 2010–2011 (from Stark et al., 2012).

| | Petajoules | Growth % | Share % |
|--------------------------------|-------------|------------|--------------|
| Mining | 389 | 10.4 | 10.1 |
| Manufacturing and construction | 1047 | 0.8 | 27.3 |
| Transport | 1479 | 2.0 | 38.5 |
| Commercial | 308 | −0.3 | 8.0 |
| Residential | 452 | 1.7 | 11.8 |
| Other | 165 | 1.7 | 4.3 |
| Total | 3839 | 2.2 | 100.0 |

is the main reason why Australia's greenhouse gas emissions per person are among the highest in the world (Table 1). In terms of carbon intensity, Australia produced 0.84 t of carbon dioxide for every \$US1000 of GDP in 2006 (Pielke Jr, 2011).

The production of energy for domestic consumption in Australia is dominated by coal, oil and gas, with only a minor component from renewable sources. As electricity generation has increased, the proportion of coal in the energy mix has more or less remained constant since 2000 (Fig. 1). During the same period, the proportion of renewables in the energy mix has increased, but it remains a small fraction. Nevertheless, renewable energy consumption in the five years to 2009 grew faster than the other three sources, increasing in absolute terms by 3.5% (Schultz and Petchey, 2010).

Transport is the biggest user of energy, followed closely by manufacturing and construction (Table 2). However, in terms of growth over this time period, mining stands out with a 10.4% increase in consumption compared to only 2.0% for transport and 0.8% for manufacturing and construction.

The most recent update to the Garnaut Climate Change Review (Garnaut, 2011) concludes that an overhaul of the electricity sector is fundamental for Australia to reduce its greenhouse emissions. A renewable energy target was introduced by the government in 2001 and expanded in 2009 with the aim of a 20% renewable share of domestic electricity supply by 2020 (ORER, 2010) and a 60% reduction in greenhouse gas emissions by 2050 compared to 1990 levels. This target is less ambitious than the ones many other developed countries have set and is below what would be needed to limit global warming to 2 °C (Meinshausen et al., 2009).

Australia's target is unlikely to be achieved, however, as to do so would require a rate of decarbonisation greater than what has been achieved by any other developed country, including France with its large-scale adoption of nuclear power, the UK with the closing of coal mines and the Japanese with an aging population (Pielke Jr, 2011). Pielke Jr (2011) argues that if Australia's energy demands were to remain at 2004 levels, with renewable energy

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