Renewable and Sustainable Energy Reviews 65 (2016) 262–273

Contents lists available at ScienceDirect

Renewable and Sustainable Energy Reviews

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

Subsidies for residential solar photovoltaic energy systems in Western Australia: Distributional, procedural and outcome justice

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ARTICLE INFO

Article history:
Received 8 September 2015
Received in revised form
10 February 2016
Accepted 26 June 2016

Keywords:
Renewable energy
Domestic solar
Equity
Justice
Subsidy
Photovoltaic
Micro-generation
Small-scale generation
Subsidies
Residential solar
Distributed energy

ABSTRACT

Governments seek to increase renewable energy capacity by providing subsidies to householders opting to install residential solar energy (photovoltaic) systems. The funds used to pay for these subsidies are sourced from tax revenue or electricity tariffs paid by all community members, including those on a low income. This sees a redistribution of funds from all community members to installers of residential solar energy systems. This research compared community attitudes towards distributional justice, or the fairness of this redistribution of funds, with outcome justice associated with the environmental benefits of renewable energy. A randomised survey distributed in four metropolitan and two regional communities in Western Australian resulted in 295 responses, a response rate of 22%. 33% of community members prioritised distributional justice, 30% prioritised outcome justice and 37% indicated that they were 'unsure' about their preference. However, support for renewable energy was found with 80% of respondents supportive of renewable energy subsidies and 68% supportive of renewable energy taxation, including in electricity tariffs. Qualitative comments indicate that in spite of the preoccupation with distributional justice in the residential solar energy literature, community members are concerned with procedural justice issues. In this case procedural justice can be interpreted as government commitment to existing policy, the expanded scope of renewable energy policy and enhanced regulations.

Contents

1. Introduction

Government policies to reduce greenhouse gas emissions increasingly rely on the use of renewable energy to replace fossil-

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http://dx.doi.org/10.1016/j.rser.2016.06.060
1364-0321/

fuel electricity generating systems. All tiers of government, from nation-states to local councils, have come to recognise the important contribution that embedded residential solar energy systems can make towards renewable energy targets. Governments have therefore instituted a range of financial incentives to promote the adoption of residential solar energy. By increasing the penetration of renewable energy, such subsidies and rebates (when efficiently delivered) can be considered to have environmental benefits associated with reduced carbon emissions from fossil-fuel based generation.

Benefits and costs associated with subsidies and rebates are, however, unevenly spread across socio-economic classes. Nelson, Simshauser and Kelley [1] found that those households within Australia's lowest socio-economic bracket paid the highest proportionate rate of small-scale renewable energy taxation (funds captured in the retail electricity tariff and designated to support solar installations). To this end policies regarding residential solar energy installations are resulting in social inequality, with households receiving subsidies sourced from tariffs that are not means tested and are therefore paid by all consumers, even those in hardship or on a low income.

1.1. Policies to promote the adoption of residential solar energy systems

Sauter and Watson [2] describe three deployment models for the adoption of residential solar energy: individualised purchasing of a system by a householder ('plug and play'), industrialised third-party assisted installation ('company control') and community-based adoption profiles ('community grid'). All models have the potential to benefit from government intervention, however most governments seek to promote individualised adoption.

The academic literature emphasises the role that government policies and incentives play in increasing individualised solar system installation rates. Rebates and subsidies reduce up-front costs to households [3] whilst other mechanisms, such as feed-in tariffs, reduce the time it takes to pay off the capital cost of systems [4]. Financial incentives have been the favoured form of residential solar energy support in many economies at different tiers of government, including the UK [5], Germany [6], Italy [7], China [8], Japan [9], New Zealand [10] and Australia [3]. The adoption of residential solar energy can also be enforced by mandating the installation of residential solar energy systems. However, experience with such a scheme in Bangladesh found that regulation did not sufficiently prevent the 'renting' of solar systems to cover obligations during the compliance period [11].

Third-party installation assistance can be made available through governments, utility companies and solar energy retailers. The most common form of third-party arrangement involves the leasing of solar systems to reduce upfront costs to consumers [12]. While this has been a successful form of support the interest associated with leasing agreements results in the total system cost being much higher than up-front system costs, meaning consumers require a higher level of confidence in the expected benefits of the system before they are likely to invest. Another form of third-party installation is where the system remains the property of the solar provider and the household enters a power purchase agreement for the solar electricity generated [13]. This has the benefit of an absence of capital costs but in some jurisdictions has been limited by regulatory barriers [14]. Indirect government intervention in the promotion of residential solar energy can therefore include the reduction of regulatory barriers to third-party access and by providing quality information on the benefits of solar.

The expansion of renewable energy can also be assisted by the formation of community groups with an interest in renewable energy. Community groups can reduce barriers to adoption by providing trusted information to community members on the benefits of solar energy, assisting community members with deciding on a solar system model, and even by purchasing systems direct from wholesalers to reduce capital costs [15]. Developing community or special-interest group business models for the increased penetration of solar is outside the remit of the government, although policies could be enacted to facilitate development of these projects [16].

Even in the absence of direct financial investment in residential solar energy governments and utilities may allow the indirect subsidisation of householders installing residential solar energy systems through a redistribution of network costs via changes in household demand profiles [17]. Many tariff structures allow this redistribution and rectifying the disparity requires considerable administrative action.

1.2. Energy-related justice literature

Given the continuing trend towards increasing renewable energy capacity, several scholars have researched the social and environmental justice aspects of renewable energy applications and policies. 'Equity' and 'justice' have been defined in terms of traditional distributive justice, that is, the equitable distribution of 'goods and bads' in human society [18]. The majority of studies assess the distribution of benefits and costs in relation to wind turbine siting, with financial 'goods' often internalised by those landowners hosting wind turbines, while negative impacts associated with changed landscape, reduced public amenity value and (perceived or potential) health impacts accrue to all residents in the vicinity of the wind turbines [19–23]. While the distribution of these elements across the local community is considered important, the potential role citizen interaction can play in decision-making processes is given priority consideration in both planning processes [24], and academic literature [25–27]. The capacity for landholders to feel that they 'have a voice' and are capable of influencing decision-making results in increased support for some energy projects, even where distribution of costs and benefits remains uneven between landholders [18]. The inclusion of citizens in decision-making, and their capacity to influence outcomes, is termed procedural justice.

The interaction between distributional and procedural justice in landowner engagements is complex. Procedural justice issues may be prioritised above distributional justice issues by members of the public who are not likely to be comprehensively affected (morally or otherwise) by a decision, whereas members of the public who perceive themselves as being significantly disadvantaged may identify a process as unjust because of an underlying distributional justice issue, even where procedures are fair and transparent [28]. In such cases, large benefits accruing to some landowners but not others may generate conflict between residents [19]. Additionally, the breadth of the community included in consultation around renewable energy infrastructure siting, and allocation of costs and benefits, will impact on perceptions of justice. For instance, some consultation processes prioritise a 'those affected' approach to engagement, identifying parties to be included in consultation based on the likelihood of a project impacting on their livelihood or lifestyle. However, it is difficult to define such a 'community', with Simcock [29] finding that community members deemed to be 'not affected' by project proponents were angered by a perceived lack of inclusivity in consultation.

The literature specifically highlights justice issues in relation to large-scale renewable energy infrastructure but less frequently considers the case of small-scale, distributed renewable energy systems. The latter could be perceived as being characterised by