Energy Policy 114 (2018) 549–557

Contents lists available at ScienceDirect

Energy Policy

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

The application of renewable energy to social housing: A systematic review

Annie McCabe[a,*], Dorina Pojani[a], Anthony Broese van Groenou[b]

[a] School of Earth and Environmental Sciences, The University of Queensland, Australia
[b] College of Arts, Law and Education, The University of Tasmania, Australia

ARTICLE INFO

Keywords:
Social housing
Public housing
Renewable energy
User behaviour
Socio-technical studies

ABSTRACT

Low-income housing associations provide a unique opportunity for renewable energy installations, through potential scale of implementation sites, and in reducing social and financial costs to tenants. As an emerging field, a systematic review format was chosen as a method of providing a 'state-of-the-art' analysis for practitioners and researchers in the field of renewable energy and social housing applications. While literature reviews are common in analysis of energy applications across many fields, systematic reviews are much rarer. Because research/policy interest in the application of renewable energy technologies and social Šhousing appears to be growing, this review aims to bring together the disparate literature already available. This review set out to determine what are the common 1. Success Factors, 2. Barriers and 3. Motivations, evident in previous research surrounding the application of renewable energy technologies in social housing contexts? Common findings from 67 research cases were synthesised under 3 *a priori* themes of Motivations, Barriers and Success Factors. Many articles revolved around the user interface and potential barriers to integration of technology, particularly where user engagement is not carried out sufficiently. It is suggested that this emphasis reflects a broader trend in applying socio-technical approaches in the field of energy research.

1. Introduction

As accessibility to renewable energy (RE) technologies grows due to enhanced affordability and efficiency, so too do the possibilities and opportunities for its application. In contrast to traditionally centralised electricity provision systems (such as coal-based electricity generation), renewable energy technologies allow for the decentralization of energy generation both in scale (individual buildings) and in the actors who participate and reap the benefits from such generation (individual consumers). With this comes the opportunity not only to address energy demand, but also reduce electricity costs for residents.

Following this, social housing (SH) is becoming a major area of interest for energy researchers. In these settings, renewable energy sources, including solar and biomass, have the ability to provide substantial benefits to the tenants (in terms of monetary savings), while having a positive environmental impact on a larger scale than individual domestic installations (Teli et al., 2016). In its essence, social housing is a service, and as such, during the provision of accommodations, electricity, and water utilities, there exists an inherent swathe of barriers and success factors embedded within the interface between the housing provider and the tenants, particularly where low-income socioeconomic factors are concerned (Moore et al., 2015). While there is a growing literature base surrounding energy efficiency and social housing (see, for example, (Reeves et al., 2010; Urmee et al., 2012)) to date there have been no systematic scholarly reviews of this phenomenon. Most literature surrounding the application of RE and social housing has proceeded on a case study basis.

This paper aims to provide a "state-of-the-art" overview of the application of renewable energy in social housing projects. This review set out to determine what are the common 1. Success Factors, 2. Barriers and 3. Motivations, evident in previous research surrounding the application of renewable energy technologies in social housing contexts? This overview will be a starting point for academics and practitioners, especially as research around the application of renewable energy for low-income and regional communities is growing substantially. The following section introduces the systematic review method employed. The findings from the review are then detailed with a focus on highlighting recurrent themes amongst the included studies, particularly around identified barriers but also success factors. The paper concludes with a discussion of potential avenues of future inquiry.

2. Methodology

A hybrid systematic review and narrative analysis methodology was employed in this study to fulfil the objective of this research: to explore key themes, from a scholarly perspective, of how and why social

* Corresponding author.
E-mail address: a.mccabe@uq.edu.au (A. McCabe).

https://doi.org/10.1016/j.enpol.2017.12.031
Received 7 August 2017; Received in revised form 27 November 2017; Accepted 20 December 2017
0301-4215/ Crown Copyright © 2017 Published by Elsevier Ltd. All rights reserved.

housing providers have chosen to employ renewable energy technologies. Where systematic reviews are often applied in health-related fields, with a quantitative outcome, narrative analyses are common in reviews of literature across case studies with variable and incomparable boundaries. This review combines both methodological choices in its design, combining a replicable systematic review protocol with qualitative analysis technique of coding and thematic analysis in narrative review. This review and analysis method was deemed appropriate as the data being reviewed was highly contextualised and heterogeneous in nature, not allowing for direct comparison, but for an assessment of the recurrent themes across the literature.

A systematic search of eight multidisciplinary databases was performed; Taylor and Francis, Web of Science, Scopus, ScienceDirect, ProQuest, JSTOR, EBSCOhost and Wiley online library. The Boolean search phrase ("housing association" OR "public housing" OR "social housing" OR "council housing" OR "state housing") AND ("renewable*" OR "solar" OR "wind" OR "biomass" OR "woodchip") was used. In a preliminary evaluation stage of this method, only the terms public and social housing were used. Later, these were deemed insufficient to fully capture the various other terminologies used to refer to such housing provision arrangements. Therefore, additional synonyms for public housing, were added to capture more articles. Only articles published between 2000 and June 2016 were captured within this study.

Within the parameters of each database query, articles not of a peer-reviewed nature were removed at the outset. This resulted in the initial exclusion of 2619 database query results. 8453 articles were then exported. Duplicate articles were systematically identified and deleted. Only 1154 identical references were identified in this process, indicating the appropriate coverage of databases selected.

Articles were first systematically reviewed and excluded based on the relevance of their title to the aim of this paper. This resulted in the exclusion of 7044 articles. The remaining article abstracts were then similarly reviewed and excluded, resulting in the exclusion of 100 articles. Full text sourcing for the remaining articles resulted in the identification of 11 articles potentially appropriate to review but not accessible by the authors. Full text review of articles resulted in the exclusion of 107 articles. 5 additional references not captured within the database query were identified over the course of this review. Of these, only 3 were accessible by the authors. To ensure appropriate review techniques, a co-reviewer appraised the exclusion process (Edwards et al., 2002). The final list of articles extracted for review comprised 67 articles. The process of sourcing the literature is graphically illustrated in Fig. 1.

While peer-reviewed journal articles were given preference, several conference proceedings and book chapters were also deemed appropriate to the review. Feature articles (i.e. not necessarily academic articles and generally with a journalistic quality) were also included providing they were tied to the objective of this paper, of academic merit, and provided some element of appraisal of the application of the renewable energy technology. Grey literature and government reports were not included within this review. This potentially reduces the number of empirical, or case-based assessments captured. While care was taken in designing the search protocol and scope of the research in order to capture all relevant references, the authors recognise the potential for terms not employed in the search protocol to also be relevant to the application of renewable energy technologies to social housing (for example the use of "low-income housing" in lieu of "social housing").

An axial coding approach stemming from the identified renewable energy technology or application in each article was used. Several *a priori* themes were explored first as a way of entering the data analysis stage of this research. Upon initial reading, it was ascertained that most of the incorporated studies were in case study formats, with much of the discussion focused around the *process* of RE integration with the social housing development, particularly the incentive in the initial stages to employ RE, the hindrances to the development and the success or failure of the development. As such the *a priori* themes were *Motivations, Success factors, and Barriers*. Key words associated with key themes of the research objective were first identified within the reference list as a way of entering the analysis. After exploring the *a priori* themes defined by the research objectives, emergent themes were identified first through the automatic detection and analysis of frequent words, utilising the software program nVivo, and through recurrent concepts found whilst manually reviewing the articles.

3. Findings

As noted, 67 articles were reviewed within this analysis (Table 1). Included articles were published between 2000 and 2016, with the majority of articles published in 2012 (Fig. 2). Author affiliations were recorded to determine a general geographic scoping of the articles within this review. Where multiple geographic affiliations were found

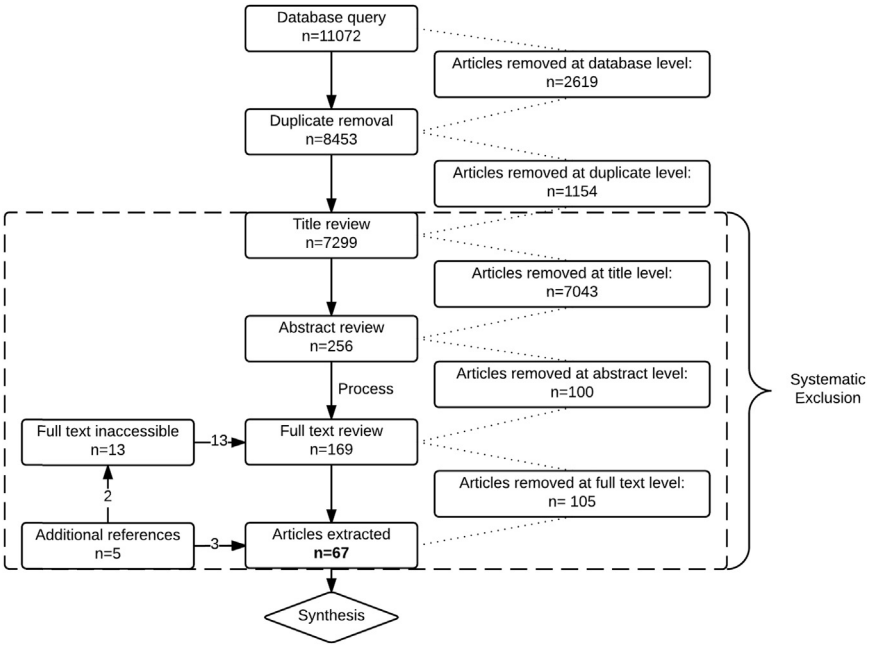

Fig. 1. Systematic extraction process of related literature.

Download English Version:

https://daneshyari.com/en/article/7397691

Download Persian Version:

https://daneshyari.com/article/7397691

Daneshyari.com