



Investigating the importance of motivations and barriers related to microgeneration uptake in the UK



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HIGHLIGHTS

- Research on factors affecting adoption of microgeneration technologies in the UK.
- Home resale value is the largest concern amongst microgeneration rejecters.
- Availability of reliable information remains a significant barrier for considerers.
- Increasing awareness of household energy self-sufficiency would boost uptake.
- Green Deal may have a limited impact on capital cost and home-resale barriers.

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ABSTRACT

Microgeneration technologies such as solar photovoltaics, solar thermal, wind and heat pumps may be able to contribute to meeting UK climate change and energy security targets, but their contribution to UK domestic energy supply remains low. This research uses a best-worst scaling survey of microgeneration adopters, considerers and rejecters ($n = 291$) to determine the relative importance of different motivations and barriers in microgeneration (non) adoption decisions. The most important motivations are earning money from installation, increasing household energy independence and protecting against future high energy costs. Results indicate that the introduction of Feed-in Tariffs has clearly encouraged a new, more financially-motivated, group to install. Financial factors are the most important barriers and of most importance to rejecters is the prospect of losing money if they moved home. The Green Deal was introduced to reduce this barrier, but may instead exacerbate the problem as potential homebuyers are put off purchasing a home with an attached Green Deal debt. The difficulty in finding trustworthy information on microgeneration is also a major obstacle to adoption, particularly for considerers, despite efforts by the government and microgeneration interest groups to reduce this barrier. Self-sufficiency in energy is a more important motivation for those considering or having rejected installation than for adopters. Provision of accessible information and greater emphasis on household self-sufficiency in energy could help improve the uptake.

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1. Introduction

Microgeneration is the generation of electricity and/or heat from a low carbon source [1] at a scale suitable for households. For example, the UK government limits microgeneration capacity to 50 kW for electricity and 45 kW for heat. The microgeneration technologies include solar photovoltaic (PV), micro-wind,

micro-hydro, micro-CHP, fuel cells, solar thermal and heat pumps (air, water and ground source).

The UK government aims to increase uptake in microgeneration in order to meet climate change and renewable energy targets [2] and to improve energy security [3]. A number of incentive schemes have been implemented since 2010 and uptake has increased in particular for solar PV: from approximately 5000 installations in 2010–400,000 in July 2013 and the total number of microgeneration installations was 520,000 [4,5].

However, the overall contribution of microgeneration in the domestic sector remains low, accounting for ~0.2% of the total energy supplied to households [4]. Significant barriers to wider

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adoption exist that must be overcome if microgeneration is to contribute to UK climate change and energy security targets, such as high capital costs.

Recent research into the consumer perceptions of microgeneration has identified many motivations and barriers in the adoption decision (as discussed in Section 3), but their relative importance remains unknown. Therefore, this research provides new understanding and knowledge of the relative importance of various motivations and barriers and how this relative importance varies between those who adopt and those who reject microgeneration. This understanding allows recommendations to be made to policymakers and the microgeneration industry that would help increase the uptake. For these purposes, we use a sample comprising existing adopters, those who are considering installing and those who have rejected it. The specific aims of the research are to:

- identify the motivations and barriers associated with the consumer decision whether to install a microgeneration system;
- elicit the relative importance of these motivations and barriers and any differences between adopters, considerers and rejecters;
- identify the differentiating factors between those who adopt and those who reject installing a microgeneration system; and
- identify improvements that could be made in policy and within the microgeneration industry and to identify population segments that would be most affected by them.

In the next section, the paper describes the background to this research in terms of recent policies that have impacted on microgeneration uptake and Section 3 gives an overview of recent research into the factors affecting consumer adoption. This is followed in Section 4 by a description of the methodology. Results are presented in Section 5 and a discussion which relates the research findings to microgeneration policy appears in Section 6. Conclusions are drawn in Section 7, including recommendations for both policy makers and microgeneration suppliers.

2. UK microgeneration policy

A number of policies have been recently implemented to remove financial barriers to microgeneration uptake: the Feed-in Tariff (FIT) [2], Renewable Heat Incentive (RHI) [6] and more recently the Green Deal [7]. The Microgeneration Strategy [3] also included a number of measures to remove non-financial barriers. These policy measures and their impact on uptake are described briefly below.

2.1. Feed-in tariffs

The FIT scheme was introduced in April 2010 and offers a fixed payment to households for every unit of energy they generate by approved, electricity-generating microgeneration installations; this is paid for by the household's electricity supplier. Depending on the technology, the tariffs were designed to give an annual return on investment of 5% [8] with the payments guaranteed for 20–25 years.

Since the implementation of FITs, the global solar PV market has grown significantly, leading to a fall in UK installation costs by approximately 50% by 2012 [4]. Over the same period, there was a 15% increase in the UK electricity price, further reducing payback times. In October 2011, the UK Government launched an emergency tariff review and proposed reducing the tariff for small solar PV by half, to 21 p/kWh [9]. The short notice period given for the tariff change, approximately 6 weeks, caused much concern within the industry due to the expected rush to install before the deadline and the subsequent industry redundancies after this period [10]. A group of microgeneration suppliers contested this change at the UK Supreme Court and the tariff change was temporarily rescinded until April 2012 [10]. As predicted, there was a spike in the number of installations before, and a sharp drop in installations observed after the cut (see Fig. 1). The process by which the tariff rate was changed may also have caused a degree of uncertainty or scepticism amongst potential adopters, adding to the barriers to adoption.

2.2. Renewable heat incentive

Renewable Heat Incentive (RHI) is an equivalent incentive to the FIT scheme but for heat generators. However, the RHI is still not available for the domestic sector – after many delays, it is expected to be implemented in Spring 2014 [11,12]. While awaiting the RHI, the Renewable Heat Premium Payment (RHPP) has been offering a small grant since August 2011: £300 for solar thermal systems (which typically costs £5000 to install), £850 for air source heat pumps (costing £6000–10,000), £950 for biomass boilers (£5000–£12,000) and £1250 for ground source heat pumps (£9000–£17,000). These grants have doubled for each technology since May 2013 [13,14]. However, households that are connected to the central gas grid, which represent 85% of the UK housing stock [15], are only eligible for a solar thermal system grant. This limits the potential uptake of the scheme, reflected in the fact that since the initiation of the grant, only 9000 new microgeneration systems have been installed [16,17].

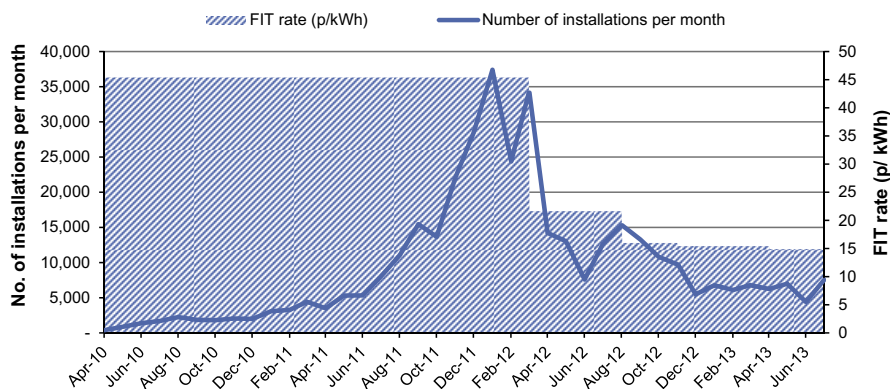


Fig. 1. Feed-in Tariff (FIT) payment rates and the number of installations per month for solar PV retrofit installations of less than 4 kW capacity [modified from [4,5].

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