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Communication

Revised feed-in tariff for solar photovoltaic in the United Kingdom: A cloudy future ahead?

Firdaus Muhammad-Sukki [a,b,*], Roberto Ramirez-Iniguez [a], Abu Bakar Munir [c], Siti Hajar Mohd Yasin [d], Siti Hawa Abu-Bakar [a,e], Scott G. McMeekin [a], Brian G. Stewart [a]

[a] School of Engineering and Built Environment, Glasgow Caledonian University, Cowcaddens Road, Glasgow, Scotland G4 0BA, United Kingdom
[b] Faculty of Engineering, Multimedia University, Persiaran Multimedia, Cyberjaya, Selangor 63100, Malaysia
[c] Faculty of Law, University of Malaya, 50603 Kuala Lumpur, Malaysia
[d] Faculty of Law, Universiti Teknologi MARA, Shah Alam, Selangor 40450, Malaysia
[e] Universiti Kuala Lumpur, Jalan Sultan Ismail, 50250 Kuala Lumpur, Malaysia

HIGHLIGHT

- Overview of solar PV installation in the UK until present time is discussed.
- Financial analysis is presented using previous, new and degression FiT tariff.
- Comparative analysis with other European countries is evaluated.
- The new FiT rate in the UK generates very low return than other countries.
- This could suggest a downward trend of UK's solar PV uptake in the future

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ABSTRACT

The United Kingdom (UK) started implementing a national Feed-In Tariff (FiT) mechanism on the 1 April 2010, which included specific payment tariffs for solar photovoltaic (PV) installations. However, a revised FiT rate has been put in place starting from 1 April 2012, applicable to any installations with an eligibility date of on or after 3 March 2012. This paper presents, first, an overview of solar PV installation in the UK. This followed by a general concept of the FiT in the UK before analyzing the financial impact of the new FiT rate on the consumers. Similar financial analysis is conducted with selected countries in Europe. The financial analysis investigates the total profit, the average rate of return and the payback period. It is found that the new FiT rate generates very low profit, minimum rate of return and a longer payback period, suggesting a downward trend of solar PV uptake in the future.

1. Introduction

Renewable energy has become a major matter of global attention in recent years as more countries are shifting their energy generation to alternative energy resources. According to the recent report by the Renewable Energy Policy Network for the 21st Century (REN21), about 16.7% of the world's energy consumption is supplied by renewable energy (Renewable Energy Policy Network for the 21st Century (REN21), 2012). The report indicates that renewable energy replaces fossil and nuclear fuels in four distinct markets: power generation, heating and cooling, transport fuels, and rural/off-grid energy services.

The United Kingdom (UK) government has implemented a number of policies which relate closely to increasing the penetration of renewable energy (Renewable Energy Policy Network for the 21st Century (REN21), 2011; Hammond et al., 2012; Owen and Ward, 2010). In 2006 for example, it was announced that all new houses in the UK require to be zero carbon by 2016 (Department for Communities and Local Government (DCLG), 2006). This ambitious requirement means that each house must be capable of independently producing the entire energy needed for its household consumption.

A typical UK household consumes about 3,300 kWh of electricity per year (Ofgem, 2012), where around 30% of the electricity is consumed by electric space-heating and cooking, and the rest

* Corresponding author at: School of Engineering and Built Environment, Glasgow Caledonian University, Cowcaddens Road, G4 0BA, Glasgow, Scotland, United Kingdom. Tel.: +44 141 331 8938; fax: +44 141 331 3690.
E-mail addresses: firdaus.muhammadsukki@gcu.ac.uk, firdaus.sukki@mmu.edu.my, firdaus.sukki@gmail.com, fmuham14@gcu.ac.uk (F. Muhammad-Sukki).

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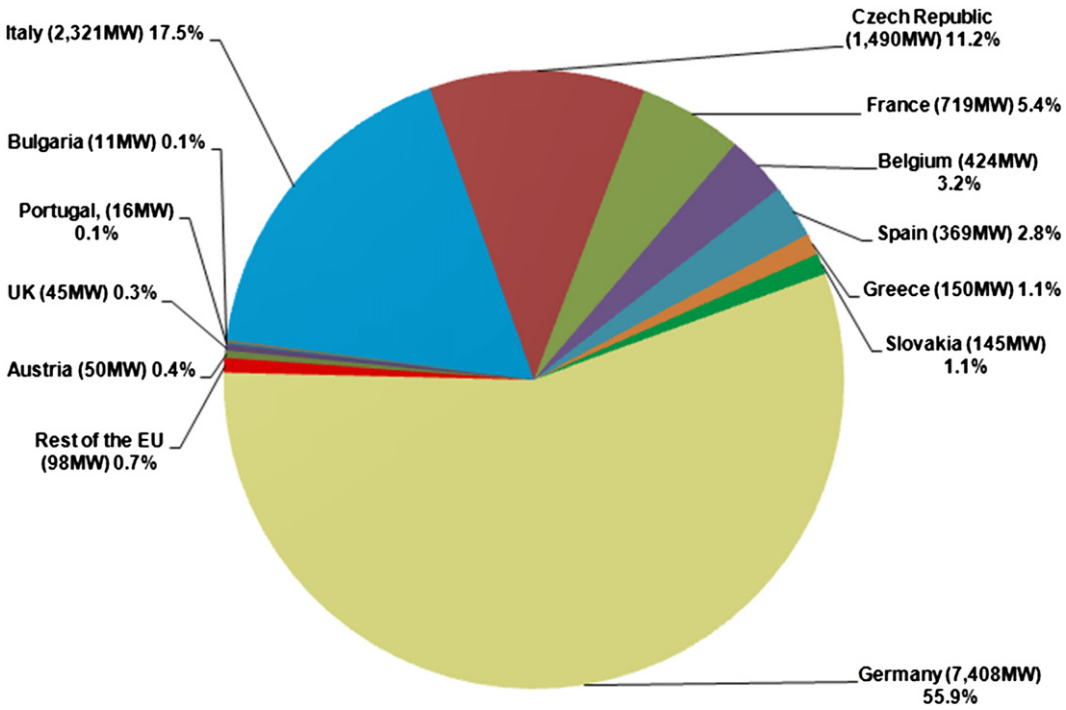

Fig. 1. 2010 European Union's PV market share. Adapted from (European Photovoltaic Industry Association (EPIA), 2011).

by appliances including lighting (Owen and Ward, 2010). Young (2008) proposed that the electricity demand of any new zero carbon household can be supplied from a conventional solar PV panel.

The UK receives a moderate amount of sunlight, with the insolation ranging from 900 to 1,300 kWh/m^2 per year (Jardine and Lane, 2003) depending on locations, with an average of around 1,000 kWh/m^2 (Energy Saving Trust UK, 2005). Despite the moderate levels of sun, the UK government recognized solar potential, and has been promoting solar PV technology since the 1990 s (Keirstead, 2007). However, as of early 2010, solar PV represented only 0.1% of the renewable energy installed in the UK, with an installation capacity of just over 32 MW (PriceWaterCoopers (PwC), 2010). Most of the installations are small domestic panels with an average capacity of less than 3 kW (PriceWaterCoopers (PwC), 2010).

On the 1st April 2010, the UK started implementing a Feed-In Tariff (FiT) mechanism, which includes specific payment tariffs for solar photovoltaic (PV) installation (Department of Energy and Climate Change (DECC), 2010). It was projected that solar PV would contribute to approximately 2.1 TWh by the year 2020[1] (Department of Energy and Climate Change (DECC), 2009). At the end of 2010, the European Photovoltaic Industry Association (EPIA) reported that Europe is the world's largest solar PV market, in which the UK contributed to about 0.3% of installed solar PV capacity (European Photovoltaic Industry Association (EPIA), 2011). Fig. 1 shows the market share of solar PV in Europe in 2010.

2. Feed-in tariff (FiT)

FiT schemes, basically, pay renewable energy producers a set rate (tariff) for each kWh of electricity generated and/or fed into the grid, and generally oblige the power companies to purchase all the electricity from eligible producers in their service area over a long period of time usually 15 to 20 years. As of 2011, FiT has been enacted in 80 countries (Renewable Energy Policy Network for the 21st Century (REN21), 2011).

A research by the Fraunhofer Institute for Systems and Innovation Research (ISI) published in 2010 (Ragwitz et al., 2010) concluded that with regards to solar energy, the vast majority of installations in most European countries have occurred following the introduction of an FiT scheme. Between 2000 and the end of 2009, FiT policies have led to the deployment of more than 15,000 MW of solar PV power in Europe (Ragwitz et al., 2010). In many European countries, the annual solar PV installation increased in excess of 300% in the first year of FiT (PriceWaterCoopers (PwC), 2010). In 2010, solar PV system was identified as the fastest growing renewable technology in the world (Renewable Energy Policy Network for the 21st Century (REN21), 2011). Globally, grid-connected solar PV has an average annual growth of 81%, mainly driven by the FiT scheme (Renewable Energy Policy Network for the 21st Century (REN21), 2011).

For any solar panel installed in the UK, the FiT could potentially benefit the participants for a contract period of 25 years in three ways: (1) All the electricity generated will gain a generation tariff per kWh; (2) Any electricity exported into the grid will be awarded an export tariff per kWh, and (3) The electricity generated can be used by the participants, which reduces the amount of electricity required within the building (Department of Energy and Climate Change (DECC), 2010). Table 1 shows the FiT rate in the UK from the start of the FiT scheme. On average, the current charge of electricity is 14.4 p per kWh (Energy Saving Trust UK, 2011).

Since the launched of the scheme, significant numbers of installations have been carried out (Ares et al., 2011; Ofgem, 2012). After one year of installation, there were 28,550

[1] The assessment by DECC in (Department of Energy and Climate Change (DECC), 2009) analyzed four scenarios: "8% Return On Investment (ROI)" scenario, "lead" scenario, "community" scenario and "non-microgen" scenario. The "lead" scenario was chosen as the recommended scenario in the UK since it achieved "*best overall balance between delivering policy objectives, including engaging households and communities in the climate change and renewable energy agenda, whilst limiting overall costs of the policy*" (Department of Energy and Climate Change (DECC), 2009).