Energy Policy 52 (2013) 190–198

Contents lists available at SciVerse ScienceDirect

Energy Policy

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

Energy saving in energy market reform—The feed-in tariffs option

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HIGHLIGHTS

- The concept of an energy saving feed-in tariff (ESFIT) is introduced and analysed.
- ESFITs are potentially an alternative to supplier energy efficiency obligations.
- To maximise effectiveness, ESFITs should be paid as capital grants.
- ESFITs are justifiable if there are premium prices for low carbon generation.
- Higher rates of ESFIT may be justified to overcome barriers to energy efficiency.

ARTICLE INFO

Article history:
Received 15 March 2012
Accepted 26 July 2012
Available online 15 September 2012

Keywords:
Energy saving
Feed-in tariff
Energy market reform

ABSTRACT

The use of feed-in tariffs (FITs) is now widespread for renewable energy and under discussion for other low carbon electricity generation, but not for energy efficiency. There is a small literature on FITs for electricity demand reduction, but not energy efficiency more generally. This paper considers the general application of FITs on the demand side and sets out the economic arguments in the context of changing energy markets. It then discusses the implications of some practical issues, including the definitional problems arising from the difference between energy efficiency and demand reduction. Using experience from historical energy efficiency programmes, it considers the public benefits, payment methods and policy scope that need to be considered and how these might affect policy design. It makes some provisional estimates of economically justified payments in the context of the proposed UK energy market reform. It concludes that FITs for energy saving might be a powerful tool for incentivising energy efficiency.

1. Introduction

Market based instruments form part of the set of policy instruments for incentivising the use of any technology or change of behaviour within energy markets. These changes include the use of higher efficiency technologies and other approaches to reduce energy demand. Classical economic theory indicates that such approaches have economic efficiency benefits compared to regulatory approaches (Tietenberg, 1990). Although it is well-established that market barriers within energy efficiency markets make such a conclusion over-simplistic in real energy efficiency markets (Brown, 2001; Eyre, 1997; Sanstad and Howarth, 1994), there is a still a broad consensus that market based instruments have a role to play in improving energy efficiency (Levine and Urge-Vorsatz, 2007). Indeed, it would be surprising to come to any other conclusion in a market economy.

Market based instruments for energy efficiency include policies that span energy markets, such as taxes and cap and trade systems, applied either to energy itself or, now more commonly, to the carbon content of energy. Such broad instruments may well have a role to play in addressing energy efficiency. However, they are not a panacea for energy efficiency. Energy price elasticities tend to be low, e.g. Hunt et al. (2003), with the result that such instruments are somewhat better at raising revenues than changing behaviour. The politics of rising energy prices make Governments unwilling to use such instruments to the level that might be required to drive rapid improvements in energy efficiency. And, even if Governments were prepared to court unpopularity in this way, the existence of market barriers means that such broad brush approaches may not even be the most economically efficient approach to securing any given change in energy efficiency.

This paper focuses on a narrower set of market based instruments—those applied specifically to energy efficiency improvement or energy demand reduction. In these cases, the price mechanism is applied only to the change in demand, rather than the whole of demand. As a consequence, the revenue raised for any given change in demand is much lower and the ratio of efficiency change to revenue transfer is corresponding higher. The political risks of raising large revenues on energy use are diminished. It is, of course, arguable that such an approach risks

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0301-4215/$ - see front matter © 2012 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.enpol.2012.07.042

creating other market distortions, but, as discussed below, it may also reduce these risks.

In principle, either price based mechanisms or quantity based mechanisms may be used. There is a large literature on this issue, particularly on the choice between carbon trading and carbon taxation and between feed-in tariffs and tradable 'green certificates' for renewable electricity. The conditions under which one or other choice has efficiency benefits are well-established (Weitzman, 1974), but this analysis is generally less important in policy choice than political and institutional considerations (Hepburn, 2006). Within the renewable electricity sector there is a developing consensus that price based mechanisms are preferable, certainly from the point of view of effectiveness but also in terms of efficiency (Ragwitz et al., 2007). A key issue, in practice, appears to be the greater 'bankability' of fixed price instruments for developers of new renewable energy projects, and therefore the lower cost of capital in such a policy environment (Mitchell et al., 2006).

In this context, it is interesting to note that market based policy instruments for energy efficiency have been almost entirely designed as quantity based instruments. The reason for this appears to lie in institutional dynamics, rather than any conscious choice by policy makers. Traditional energy efficiency policy has relied heavily on regulatory measures, both on products and the energy supply sector. As noted above there are some good reasons for this. Within the energy sector, particularly in the USA, regulation was traditionally predicated on securing minimum cost outcomes within monopoly markets. This led to the notion of 'least cost planning' (Moskovitz, 1990) or 'integrated resource planning', within which 'demand side management' approaches could compete to supply demand reduction (so called 'negawatt hours') against new supply. In the 1980s these programmes were large and successful in the USA (Hirst, 1992). Market based instruments for energy efficiency did not emerge at all until structural change within the energy sector made non-market approaches infeasible in the 1990s. Whilst mandated energy efficiency programmes declined in the USA, in Europe a market based variant was adopted, first in the UK (Lees, 2008), then Italy (Pavan, 2008), France and elsewhere (Bertoldi et al., 2009a). Instead of energy suppliers (or distributors in Italy) having fixed targets for efficiency improvement in their customers, they were given tradable targets, and thus the concept of 'white certificates' was born.

The programmes have been successful and are increasingly significant in scale. In general, the white certificate approaches are seen to have worked well. In the UK, a move away from 'baseline and credit' towards 'cap and trade' was suggested (Defra, 2007), but dropped as unworkable (Eyre, 2008). The extent of trading is actually quite limited, except in Italy (Pavan, 2008). There has been no serious political consideration of a fixed price approach. In the initial context of market liberalisation, any price regulation was unfashionable, and therefore the alternative of 'fixed price, variable quantity' regulation was not really considered. But the policy context has changed. Governments, in general, are considering much stronger intervention in energy markets to deliver climate and energy security goals. And energy efficiency often forms an important part of the policy framework, at least rhetorically. So re-consideration of the fundamentals of energy efficiency policy is now more likely. With the widespread acceptance of the merits of price based market instruments (feed-in tariffs) for renewable energy, a similar approach to energy efficiency merits consideration.

The concept of an energy saving feed-in tariff is not entirely new. The idea has been introduced (Bertoldi and Rezessy, 2007; Bertoldi et al., 2009b) and more recently explored for the UK (Benton, 2011). But in all these cases, the idea has been to model the introduction very closely on similar renewable energy policies, with payment for monitored reductions in kWh of electricity. This paper addresses wider questions relating to the use of price-based mechanisms for energy efficiency, including use for other fuels, support for energy efficiency technologies irrespective of demand changes and other forms of incentive payments.

The next section sets out the case for change away from existing market based incentive approaches and towards an energy saving feed-in tariff (ESFIT) approach. Section 3 then explores the key issues that such an approach raises: what exactly is being incentivised? What is its value? How should that valued be paid to energy users? And what should be the scope of the policy instrument? Section 4 quantifies some indicatives payment levels. Section 5 discusses some of the other issues raised. Section 6 draws preliminary conclusions.

There is a focus on the UK, partly because there is a strong commitment to market based mechanisms. This is the market where quantity based market mechanisms for energy efficiency were first used and therefore are best established, and significant reform of electricity markets is now planned that raises new questions. The lessons, however, are more broadly applicable, at least to developed countries with competitive energy markets.

2. The case for change

As outlined above, the traditional context for energy efficiency in utility regulation was the desire to ensure optimum efficiency in the delivery of energy services (as opposed to energy commodities) to utility consumers. With the rise in faith in markets to deliver optimal outcomes with less intervention in the 1990s, this classical monopoly regulator approach became less influential in the USA. The baton for policy development in this area moved to Europe, where formal systems of utility regulation were being adopted for the first time (to replace state-owned monopolies). The key drivers for energy efficiency were climate change and energy security, i.e. policy goals related to public goods.

The new systems of regulation for privatised energy companies were convenient mechanisms for policy-makers to use to take forward energy efficiency. But the goal was still broadly similar—to ensure reasonably cost effective energy efficiency investment as part of energy sector development.

The long term context has changed dramatically, at least in Europe. The scale of carbon emissions reduction now envisaged by mid-century, coupled with rising concerns about hydrocarbon fuel availability and cost, point to a systemic change. Rapid power system decarbonisation is the best known feature, but most analysis (e.g. International Energy Agency, 2010) indicates that other facets include much faster improvement in energy efficiency and electrification of much fossil fuel demand, i.e. a systemic change in energy demand as well as supply.

It is questionable whether incumbent energy suppliers in the current market structure are the best actors to lead a drive to improving energy efficiency. It has been argued that one of the reasons to prefer feed-in tariffs over tradable certificates in renewable is that it provides greater support to new market entrants and that this is required to deliver the necessary innovation (Mitchell, 2007). The same argument potentially has even more force on the demand side. In liberalised markets, energy suppliers have no incentive to reduce sales—quite the opposite. They are generally not well-placed to undertake energy efficiency improvement work on the ground. In the main they do not do this even within white certificate systems; they have not integrated vertically downwards into energy efficiency, but instead they sub-contract delivery to building sector and electrical appliance retail companies. These delivery agents and their clients can only access the financial incentives of the white certificate through the obligated energy companies. The certificate